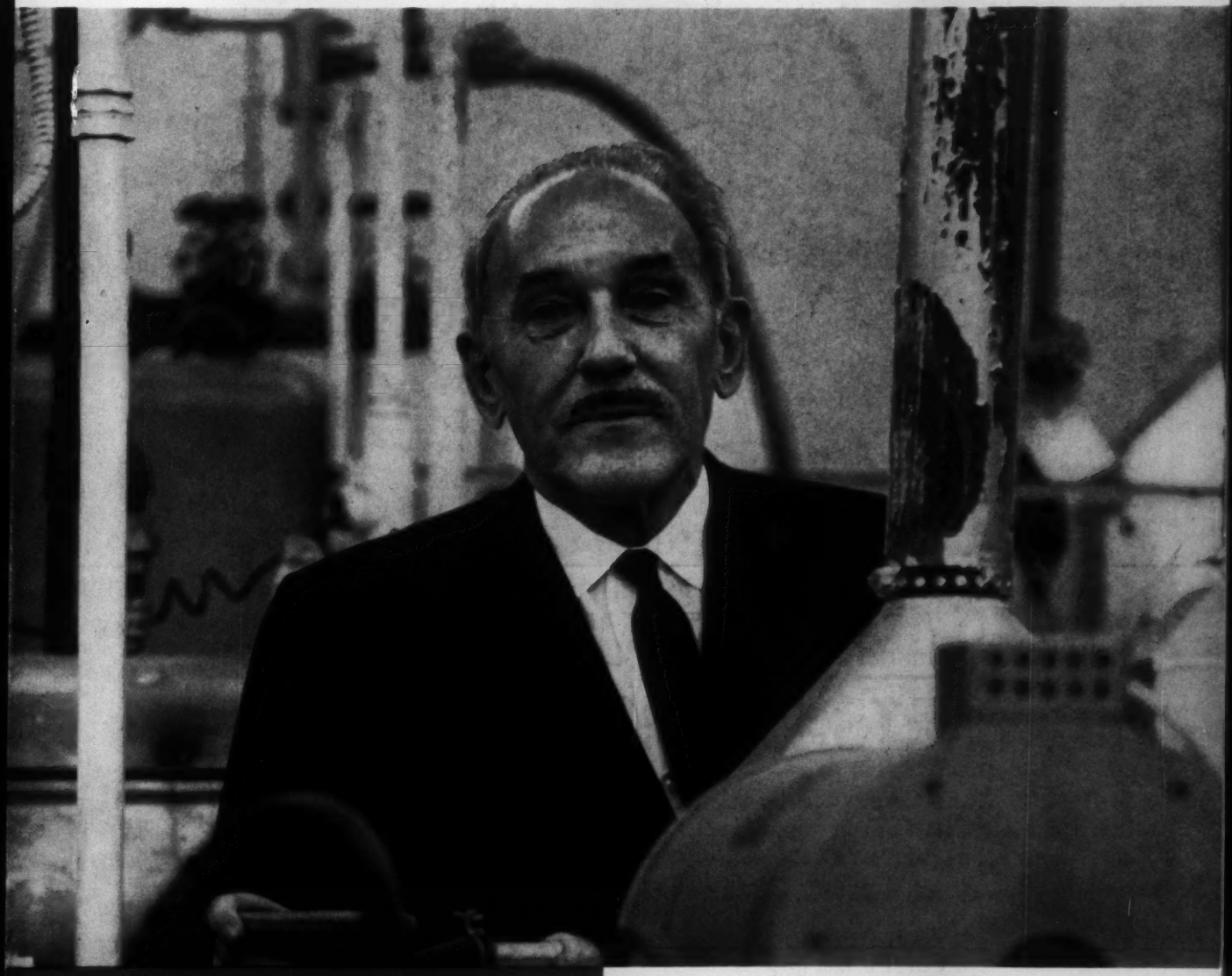
The IRON AGE

January 18, 1960 A Chilton Publication The National Metalworking Weekly



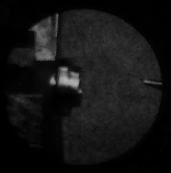
Fansteel's Dr. F. H. Driggs—

New Technology Finds Major Markets For Minor Metals P. 67

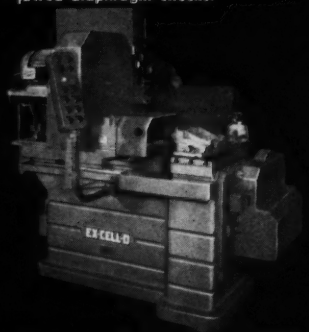
Management's Role In Numerical Control – P. 107

New Market Ahead For Steel Users – P. 72

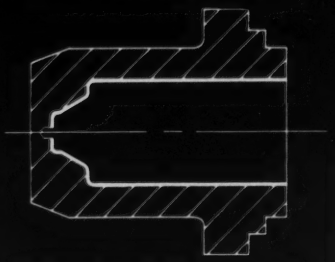
Digest of the Week – P. 2-3



LEFT—Closeup photo shows the .003" radius boring tools and the size of the parts held in the three-jawed diaphragm chucks.



ABOVE—The Style 308 Cam-Operated Precision Boring Machine used in this high-output machining operation.



ABOVE—Cutaway, twice actual size of the part, shows contour of the finished cut. Surface finish is held to 12 RMS.

59-20

BORES AND CONTOURS 184 PARTS PER HOUR

Style 308 Cam-Operated Precision Boring Machine finishes small stainless steel parts to 12 RMS

Speed and precision in continuous, close-tolerance production of contoured parts come easy to this Ex-Cell-O Cam-Operated Precision Boring Machine. Direct cam action makes it possible. Two cams are mounted on a single shaft; one acts directly on the cross slide follower, the other on the table follower. There are no levers. Changing the cams changes the form for the next job—in minutes.

Style 308 (illustrated) and the larger Style 312 hold the parts in one or more spindles, tools are mounted on the cross slide. The machine above uses such a setup to straight-bore and generate the inside contour of 184 parts per hour, two at a time.

If you are anxious to get a similar production process underway quickly and economically, start now by calling your local Ex-Cell-O Representative. Or, if you prefer, write direct.

EX-CELL-O FOR PRECISION XLO

EX-CELL-O CORPORATION Machinery Division

DETROIT 32, MICHIGAN

EX-CELL-O PRECISION PRODUCTS INCLUDE: MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • THREAD AND GROOVE GAGES • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT.

KNOW YOUR ALLOY STEELS . . .
This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Quenching Media for Alloy Steels

In the quenching of alloy steels, several points require consideration, among them being the size and shape of the piece, the type of steel involved, the quenching medium, and proper agitation of the quenching bath.

The composition of the steel has an important bearing on the selection of a quenching medium. As an example: shallow-hardening steels require a fast cooling rate, whereas deeper-hardening steels require progressively slower rates as the alloy content increases.

Three commonly used types of quenching media for alloy steels are water, oil, and air. These are discussed below in the order of quenching severity:

(1) **WATER.** Since shallow-hardening steels require fast quenching rates, water is the quenching medium used to harden them. Agitation is generally used to help in obtaining the desired cooling rate. The use of brine solutions have proven beneficial when sufficient agitation cannot be obtained. It should be noted that the quenching rate drops as water temperature is increased. The range of 70 deg to 100 deg F is recommended.

(2) **OIL.** An oil quench cools more slowly than water, and faster than air. Oil-hardening steels can be hardened with less distortion and greater safety than water-hardening steels. Mineral oils are generally used because of their low cost and relatively stable nature.

(3) **AIR.** If sufficient alloying elements are present, critical cooling rates are decreased to the extent that certain steels can be quenched in either still or forced air.

While the choice of quenching medium is of prime importance, there is another factor that should not be overlooked. This is the agitation of the quenching bath. The more rapidly the bath is agitated, the more rapidly heat is removed from the steel, and the more effective the quench.

Bethlehem metallurgists will gladly help you with any problem related to quenching or other phases of heat-treatment. They are men of long practical experience in this field, and they understand fully the advantages and limitations of each method. Always feel free to call for their services; their time is yours, without obligation.

Remember Bethlehem, too, when you are next in the market for AISI standard alloy steels, special-analysis steels, or carbon grades. We are always in a position to meet your needs promptly.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
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The IRON AGE

February 18, 1960—Vol. 185, No. 7

Digest of the Week in

★Starred items are digested at right.

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News of the Industry

ALUMINUM RULING

Precedent Set? — FTC ruling against Reynolds may precede other government actions against aluminum producers. Producers fear action to halt acquisition of fabricators. P. 70

EXPORT TRADE

Plan of Action—U. S. trade officials, concerned by widening gap between exports and imports, are

moving into action. First step: Meetings with manufacturers on ways to improve export trade. P. 71

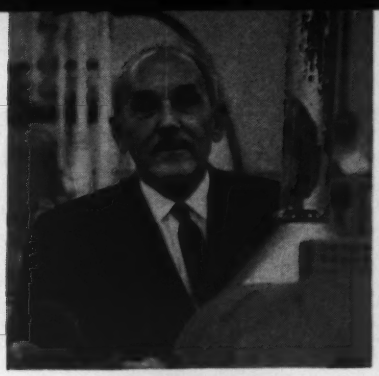
STEEL MARKET

Not Collapsing—Fast comeback by mills and tight inventory policies have eased the market. But consumption remains high and no early collapse is likely. P. 72

BUSINESS CONFORMITY

More Daring Wanted—It's the individualists, not the conformist that big business values, survey

Metalworking



Cover Feature

MINOR METALS: Metalworking executives like Dr. Frank H. Driggs, president of Calumet & Hecla are developing wide, new markets for the so-called minor metals. Technical breakthroughs created a broad range of uses. P. 67

shows. Top company executives favor managers who show daring and initiative. P. 74

INDIAN AID

More Coming — The President wants more aid for India. It will use the money to buy U. S. machines and equipment to meet growing industrial demands. P. 87

Engineering-Production Developments

NUMERICAL CONTROLS

Management's Role — Numerically-controlled machine tools are coming more into vogue. Management plays a big role in furthering their use. But what is needed is compromise between two groups: Designers and production people. When this is accomplished, then the ideal tool goes into action. P. 107

FOUNDRY CLEANING

Lower Costs—Here's how one foundry cut cleaning costs with blast barrel automation. By replacing two 18-cu ft blast cleaning barrels with one 27-cu ft unit, cleaning times have been reduced from 20 to 8 minutes per load. The setup eases maintenance and improves materials handling. P. 110

MACHINE TOOLS

Rebuilding Them — At certain times most machine tools require reconditioning or even rebuilding. Proper installation is the starting point. Preventive maintenance then carries the major load. But rebuilding should not be overlooked to meet tight working tolerances. P. 112

LOW-SULPHUR STEEL

On Tonnage Basis—The rotary reactor process for desulphurizing steel can now lay claim to meeting the challenge of tonnage production. The process reduces sulphur and silicon contents of hot metal rapidly and drastically without damaging refractories. P. 114

HARD COATING ALUMINUM

At High Speeds—A new anodizing method hard coats aluminum parts using very high current densities. The process is said to be 10 to 50 times faster than conventional setups. It also produces end products of good quality that are lighter in color. P. 118

Market and Price Trends

MARKET RESEARCH

It Gets Results—Big companies aren't the only ones that can afford to use or get results from a market research program. Small and medium size companies can use it to show where they can get more business. P. 75

AUTOMATIC ASSEMBLY

Automatic Assembly — Metalworkers are looking over a lot of possible ways to hold costs down. Automatic assembly is an area that will get more attention in the future. Improvements in controls have increased reliability. P. 91

STEEL SUMMARY

Orders Drop—Incoming orders for steel are 10 pct below a month ago. Overbooking and strict inventory control account for some of the drop. But overall use is still high and no sudden market drop is likely in the near future. P. 157

PURCHASING

Export Boom—Pressmakers are having a good year and the big reason is a growing export market. Domestic and foreign automakers are buying more than before. P. 158

NEXT WEEK

STAMPING LINE

Less Set-Up Time—Big gains in production are possible by using a spare bolster in stamping line operations. Next week's technical feature shows how these moving bolsters cut wasteful set-up time and double output as well.

How B&W JOB-MATCHED TUBING helps you engineer-for-profit

You can count on B&W Tubing to help reduce costs and make a better product because from B&W you can get:

- ... a choice of either seamless or welded types to meet your job requirements economically.
- ... standard or special specifications to help simplify fabrication.
- ... engineering help in your selection of the *one* tubular product best suited to your needs.

These are just a few of the reasons why it pays to specify B&W Job-Matched Tubing. Call your local B&W District Sales Specialist, or write for Bulletin TB-361 for full details. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

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TUBULAR PRODUCTS DIVISION

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Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

B.F.Goodrich

River of waste acid flows under river of water

B.F.Goodrich improvements in rubber brought extra savings

THE man in the diving suit is on his way to the bottom of the river to fasten another river in place. A paper mill across the way has to get rid of big quantities of hot waste acid. Just dump it in the river? That would pollute the water, kill fish.

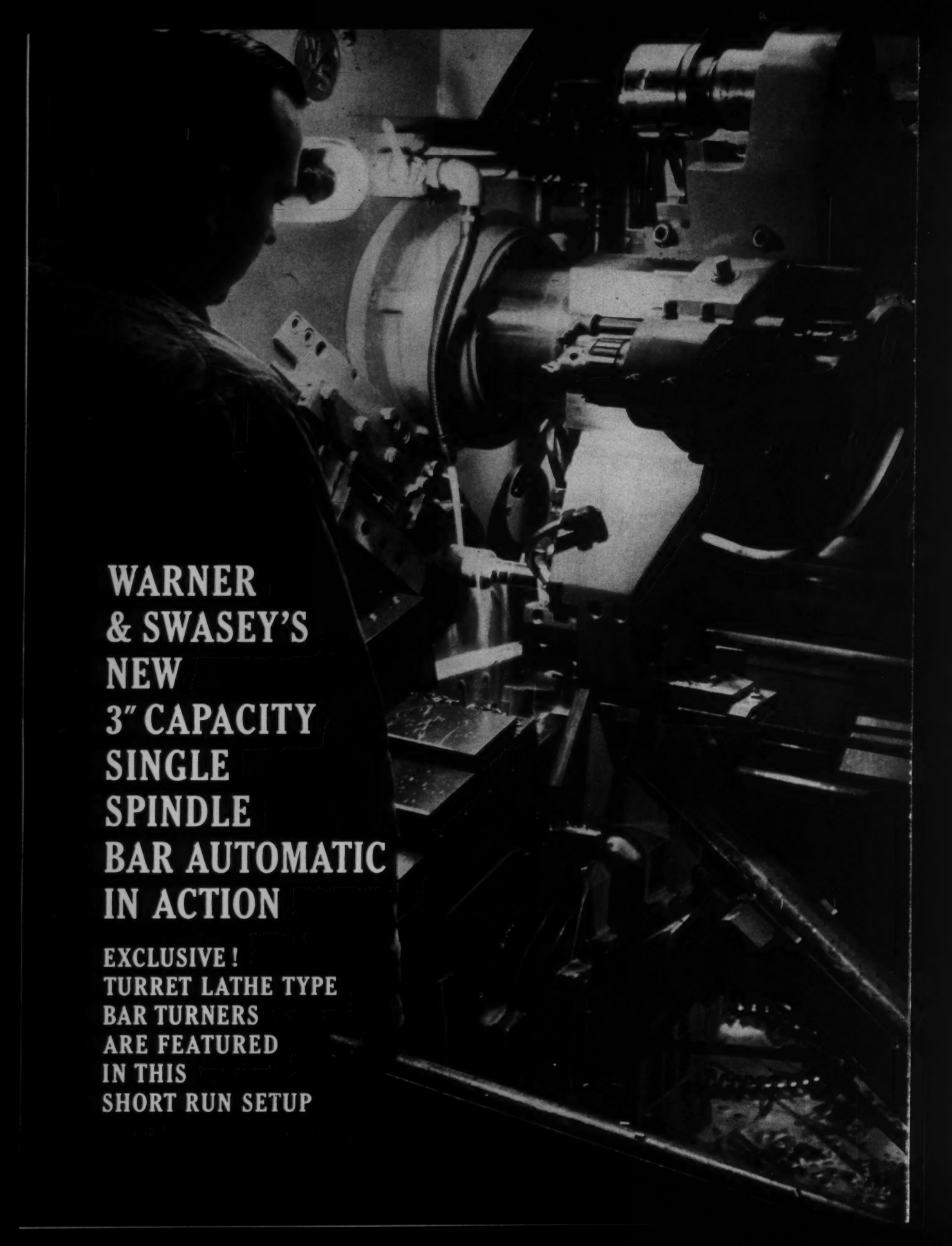
Someone suggested taking the liquid waste across the river to a man-made lagoon. But how? Even the strongest steel pipe couldn't stand the hot acid or the buffeting of river currents.

After talking with a B.F.Goodrich distributor, paper company engineers decided to try rubber hose made by B.F.Goodrich. The lining of this hose is made with a special rubber compound that stands hot acid. A spiral of steel wire buried in the hose keeps it from collapsing even under powerful suction. The thick, tough cover resists scuffing, gouging, and tears.

The first B.F.Goodrich hose line was hooked up, stretched across the water, then fastened to the river bottom by 2200-pound concrete forms. The hose lasted 11 years without leaks, prevented pollution of the river even at times of low water. Because of this fine performance, the company replaced it with 800 feet of new B.F.Goodrich hose this summer.

Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich hose described here. And, as a factory-trained specialist in rubber products, he can answer your questions about the many rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-789, Akron 18, Ohio.*

B.F.Goodrich *industrial rubber products*


WARNER
& SWASEY'S
NEW
3" CAPACITY
SINGLE
SPINDLE
BAR AUTOMATIC
IN ACTION
EXCLUSIVE!
TURRET LATHE TYPE
BAR TURNERS
ARE FEATURED
IN THIS
SHORT RUN SETUP

So What Must We Do About Our Defense Posture?

The President has chastised critics of our defense posture. He said we, the people, will make decisions when we have the facts. The critics are not going to be silent. None of us wants that.

We remember that not too long ago the Reds were not supposed to have the A-bomb. But they had it—far ahead of our schedule for them. They were not supposed to have the H-bomb. But they had it far ahead of our schedule for them.

At first we refused to believe their feats in space. News of Sputnik I was a shocker. Then the interest died down.

It was not until much later that any of our top advisers readily admitted that the Reds were far ahead of us. Only now do our highest military men admit that we are far behind in rocketry.

It seems but yesterday that we were told our government was concentrating on intercontinental ballistic missiles. We did, but the Reds were ahead of us.

This is not to say we have given up. Nor is it to say that we will never get to an advance position on missiles and space apparatus. It is only a recall of those times where in the past we have been treated by government as children who should be calmed before we slept.

You can spend only so much money. You can go only so far in a democracy if you are to keep from turning it into a dictatorship. And you can either trust the men you put in charge or lose faith in them. But whatever you do in these times must be for keeps. A bad misstep by our leaders could leave us with few, if any, alternatives.

As for the people telling their leaders what to do if they have the facts: Perhaps the people are not getting all the facts. If so many privy to the same intelligence come out with different answers, what can we expect Joe Doakes to believe?

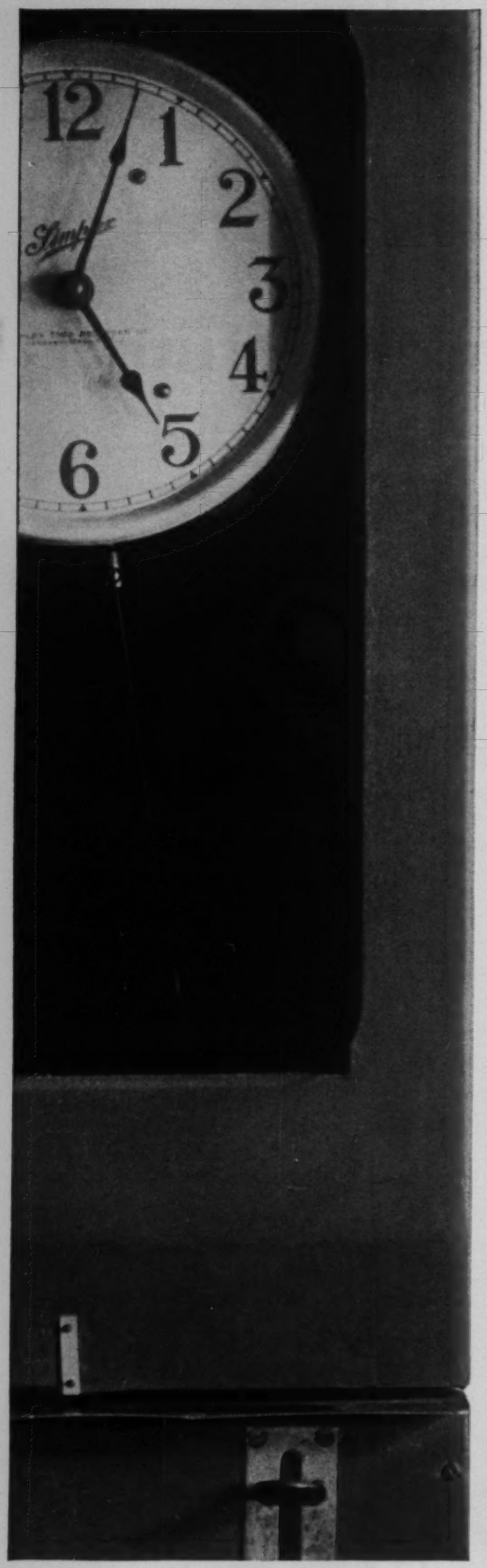
He has no other choice than to hope and trust that our top government people know what they are doing. The fact that he has not become too aroused suggests that he does trust those he puts in charge.

If the time comes when we don't feel secure against the Reds, we will change the team at the top. Until that time, we can afford a thorough airing of our defense setup no matter who gets angry at whom.

Our people never can agree that what has been done is necessarily the best that can be done. Our defense demands continuing and painful checking, questioning and criticism.

Tom Campbell

Editor-in-Chief



"PUT THE CAT OUT, JOE everyone's gone home! No need for overtime to get steel ready for tomorrow's production —we're right on schedule."

Big help is your nearby Steel Service Center backing up production schedules with steel cut to exact size, if desired—delivered right into your plant precisely as needed—eliminating costly in-plant inventory—contributing to your over-all operating efficiency.

Capital tied up in unproductive steel storage, time-consuming cutting, scrap waste, excessive handling, is a thing of the past with manufacturers who take advantage of the services made readily available by their Steel Service Centers. A talk with your Steel Service Center representative could be important to you. He can show you how using his organization and its facilities, is like adding an entire warehouse and its personnel to your operation without investment. Why not call him, today?

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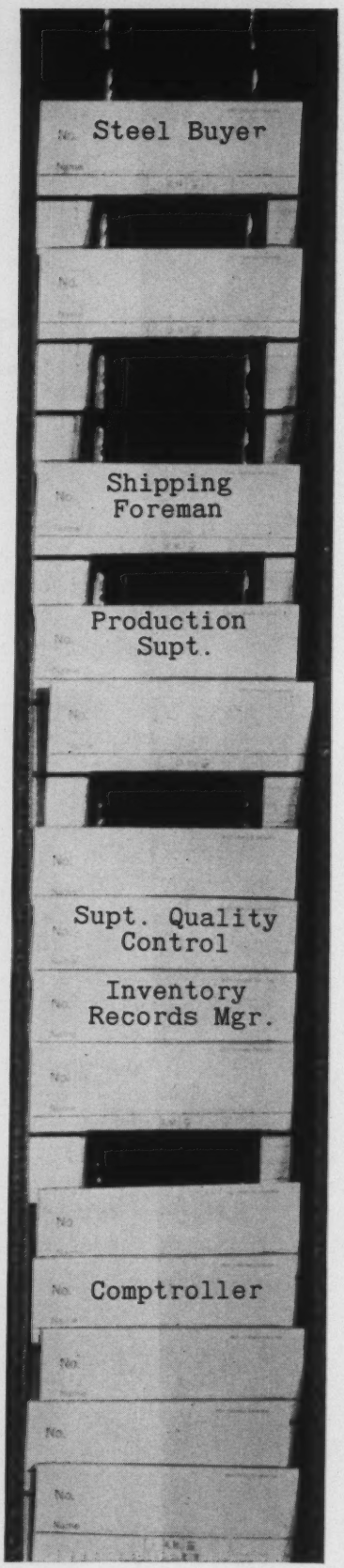

Add Carbide Tips in Shop

Carbide tips or entire tools, to withstand high temperature or corrosive media, can be made right in the shop. Conventional tools machine a new material, Ferro-Tic S, made by Sintercast Div. of Chromalloy Corp. Available in two grades, the material is produced by powder metallurgy methods which embed tiny crystals of titanium carbide in a softer matrix of stainless steel.

Flux Acts as Adhesive

A new fluxing additive acts as an adhesive to keep the flux close to the base metal. The additive eliminates the critical time between fluxing and hot dipping. In fact, parts have been flux dipped, allowed to dry, then hot dipped three weeks later with excellent results. The additive can be used in any aqueous flux bath.

Computer Is Shop Tool

A giant electronic computer helps to produce second generation all-transistorized data-processing systems in record time. The "mother" computer acts as a production tool. It also replaces 10,000 drawings of electrical circuits by lists of tables and symbols recorded on magnetic tapes.

Unit Classifies Tinplate

Completely transistorized, a data acquisition system classifies tinplate coils. With the tinplate line operating at speeds up to 2000 fpm, the automatic inspection device records information from a footage meter and visual inspection station. The data recorded include complete records of tinplate quality with all defects noted.

Unlimited Oxygen Supply

Transportable oxygen units produce an unlimited supply of oxygen from the atmosphere. They replace heavy steel cylinders. The units draw air from the atmosphere, filter out contaminants, extract oxygen and deliver the gas at about 5-psi pressure in less than one minute after activation. An early prototype from Aerojet-General Corp. requires ordinary house current. Future units will be gasoline or battery powered for field operation.

Braze Huge Honeycombs

Brazed honeycomb sections can now be produced in sizes up to 10 x 14 ft in precipitation hardening stainless steels. An "electric blanket" handles the brazing at 1600°-2000°F. To reduce thermo conductivity in the braze, a solder of 5.5-pct indium, 2.2-pct palladium, 0.2-pct lithium and 7.5-pct copper is used in a silver-base metal.

Infra-Red Checks Quality

Infra-red film in your plant camera can be an important maintenance and quality control tool. Metalworkers are shooting infra-red pictures of castings to check heat loss. Imperfections in the castings show up at different heat loss levels. Similarly, infra-red photos of large furnace jackets detect hot spots; thus indicating potential refractory failures.

How Big Is the Gap?

"Gap" has become a national byword. First we were warned to close the missile gap. Now this warning comes: "Close the gap in military buying." The warning comes from Sen. Saltonstall, R., Mass. He says the time lag between development of a workable idea and the delivery of a military item could be almost twice as long in the U. S. as in the Soviet Union.

New Recorder Gages Steel

An electro-mechanical recorder maintains thickness of hot steel strip during 1200 fpm rolling operations. A roller operator takes a 4-in. edge-to-edge sample of hot strip for a routine surface check. The sample is chilled in water; then processed on the portable gage recorder. Within 3 minutes, all gage variations are automatically graphed, and the roller takes corrective action.

How to win the race to produce more hot metal

It's no longer simply "theory." Leading steel mills have proved that Island Creek Precisioneered Coking Coals can boost production significantly. If you want increased hot metal without the delay or expense of physical plant expansion (and actually at lower net cost per ton) get the complete, documented story from Island Creek engineers at once.

The technical story is something to get direct from Island Creek Coking Coal specialists. But the principle, itself, is just this simple: Island Creek Precisioneered Coals are from inherently superior metallurgical seams. They're lower in ash, sulphur and moisture. They are manufactured to precision standards. Result: improved coke yield and through-put, and a stronger coke, with more effective carbon. You use less coke, therefore, per ton of iron, save more furnace space for producing hot metal. And while you're getting this increased production, you're getting lower net costs. Island Creek has the tools (including a modern carbonization laboratory with test oven of full commercial width) to evaluate coking characteristics of coal blends and predict, in advance, results you'll be able to prove in a test run. Phone or write. No obligation.

P.S. TO STEAM COAL BUYERS
An Island Creek Precisioneered Coal may help you lower your cost per 1000 pounds of steam.

ISLAND CREEK
Precisioneered Coking Coals

You can depend on Island Creek . . . a career company dedicated to coal

ISLAND CREEK COAL SALES COMPANY, Chafin Building, Huntington 18, West Virginia • Chicago • Cincinnati • Cleveland • Detroit • Greensboro • New York • Pittsburgh

Friendly Gesture

Sir—I am writing to you because I wish to keep my good friends who have been loaning me, time and time again, their edition of your very useful publication, "Metalworking Handbook."

Please forward to me a copy of this excellent reference for my own use. I just can't face the fellows the 86th time to borrow "Metalworking Handbook." — R. King, Scientist, Metallurgy Section, Westinghouse Atomic Power Dept., Pittsburgh.

▪ **To help you keep your friends, the copy is on the way.—Ed.**

Wrong Letter

Sir—We recognized the photograph, but not the company! Feb. 4 issue of The IRON AGE (P. 56) carried an item on Alco's new research and quality control laboratory at Latrobe, Pa., but twice identified the owner as "Arco Products, Inc."

Since we share with The IRON AGE a newsman's phobia for correct spellings, we felt duty-bound to point out the slip in an otherwise timely news item.—R. C. Witherell, Mgr. of Public Relations, Alco Products, Inc., Schenectady, N. Y.

▪ **Our apology. We slipped up. —Ed.**

Help Wanted

Sir—It was with much interest that I digested your article in the January 14 issue of The IRON AGE; "Industry Needs More Generalists To Fill Top Executive Posts." This seems to be a topic of major concern in many articles that I read.

The cultivation, production and recruiting of people of ability and potential is like our observation of the weather: Everybody talks about it, but nobody does anything about it.

"Stagnation"—By now are you wondering what I am raving about? My gripe is that there are people available, eager and able to accept the responsibility of top executive decisions but they are stagnating in the lower echelons of management.

Will you be kind enough to write me an answer to the following:

I am 37 years old, have been with my company since 1948; a foreman since 1951. Since leaving the service in 1946, I have attended one university and two university extensions.

I will graduate June, 1960 from a university. My company's organization is static.

Question: What to do? How does one become available, known and investigated by those who are experiencing the difficulties you describe in your article?—Name Withheld.

▪ **Unfortunately, we have no solution for the man who is in a static company, except: "Look around."—Ed.**

I see the Russians are ahead of us again.

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To the Executive
who watches his Competition closely . . .

Are you investigating Clad-Rex Vinyl-Metal Laminates?

Don't wait *too* long! Because Clad-Rex really reduces manufacturing costs *and* increases product sales appeal. And *that* kind of advantage would be better yours than your competitor's. Many other manufacturing executives are already using Clad-Rex vinyl-metal laminates for electronic equipment cabinets . . . automotive trim . . . appliances . . . furniture, etc.

Here are the facts:

Clad-Rex is a calendered, semi-rigid poly-vinyl chloride film laminated to sheet metal. All alloys and tempers of aluminum and steel (including galvanized and aluminized) are commonly used. Other metals can be used where their special properties are important to end product performance.

The most obvious advantage of Clad-Rex vinyl-metal laminates is styling. It's unlimited! Simulated woodgrains and leathers as well as a wide variety of colors and textures in sparkling burnishes (including high metallics), or non-reflective matte finishes. You can design your own if you prefer!

Not so obvious, *but most important of all*—Clad-Rex vinyl-metal laminates are practical. There is no complex technique or special tooling required to fabricate Clad-Rex. It can be fabricated in almost as many ways as any *un*-finished sheet metal. Furthermore, and without charge, a Field Fabricating Engineer is provided to show your production people how easy it is to get into production with Clad-Rex.

Actually, Clad-Rex *simplifies* your manufacturing operations. It's finished before you get it. Movement of sub-assemblies, etc., through your plant becomes more direct—out of your dies into assembly.

Clad-Rex lowers your end product cost. Although Clad-Rex costs more than *un*finished metal coming into your plant, elimination of expensive handling and finishing adds up to *less cost* when your product is ready to ship. Clad-Rex resistance to abrasion often eliminates the rejects common to *un*finished or other pre-finished metals. This includes the costly efforts to salvage those rejects, too.

Your product may need these other characteristics of Clad-Rex vinyl-metal laminates—high dielectric strength, and resistance to the corrosion of acids, alkalis, and household detergents.

So, see for yourself. Write for details. No obligation, of course. Perhaps you won't be first in your field to begin using Clad-Rex. But why risk competitive disadvantage by being last?

VINYL-METAL LAMINATES BY **CLAD-REX** DIVISION OF SIMONIZ COMPANY

2119 Indiana Avenue • Chicago 16, Illinois

Telephone: VIctory 2-7272

3-A

Expensive Tastes

An experienced metalworking editor used to dealing in tonnages has to back up and start all over again when he starts investigating the minor metals.

For example, Union Carbide Metals Co. informed our editor that early this year the company had succeeded in producing a large quantity of scandium metal 99 pct pure. It was the first time this had ever been done.

Big Pound—The "large quantity" is one pound—two discs about 3⅛ in. in diameter and ¾ in. thick. But don't write this accomplishment off too quickly.

FOR WHOM? The bell with the $6000 toll.

The work was done under a contract from the U. S. Air Force. It is vitally interested in scandium. It is about as dense as aluminum, but has a melting point 2½ times as high. And Union Carbide is so interested in the possibilities of scandium that it picked up part of the tab on the project.

Slip-Casting—Of course, not all the applications discovered for the minor metals are quite that serious. Union Carbide has a little hand-size bell of tungsten which it values at about $6000. The company was interested in seeing if it could slip cast odd shapes and chose the bell shape for its experiments.

And a sales engineer for another company which produces tungsten powder says he had an inquiry the other day on the possibility of including some tungsten in the making of poker chips to give them a little more heft and wear.

Also, after calculating prices and price trends of the major metals by the cents per lb, it's a little unnerving to talk to some minor metal producers. For instance, Chase Brass is now selling a line of rhenium mill products. It reports that the price trend will definitely be downward — from the current $780 per lb for wire. A lb of gallium will cost a cool $1500.

Should Yes Men Say No?

How helpful is the "yes man" to management?

Opinion Research Corp., Princeton, N. J., found he has limited value. Researchers there told our editor why the top man doesn't want to be "yessed."

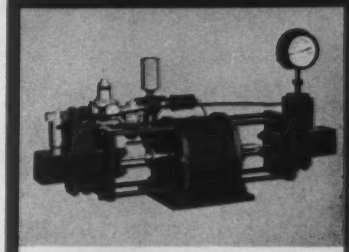
During interviews with ORC, company presidents pointed out they don't want to be fed back their own ideas. "I got rid of a man," one executive said, "because all I kept getting was my own thinking played back. And he wasn't as good in remembering it as I was."

"One technique," say the researchers, "is to throw out questions down the line or ask for opinions. Some presidents send out false feelers to test the strength of a subordinate's convictions."

Even static and dissent coming back is more helpful than silence or bland agreement. For these, and other reasons, the organization man's value is only limited. (For more details see story on p. 74.)

ALDRICH

AIR-DRIVEN HYDRAULIC PUMPS



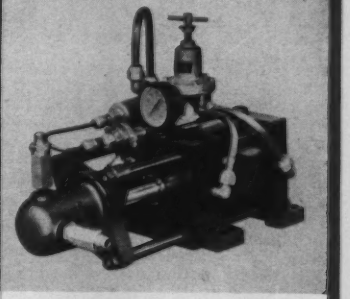
For production service: Heavy duty 6-inch stroke pump, single or double acting.

For production or laboratory . . . handling small volumes of fluid at pressures up to 50,000 psi.

For hydrostatic testing . . . tubing, valves and pressure vessels.

For operating hydraulic presses, cylinders and valve positioners.

Immediate shipment from factory stock.



For intermittent service: 3-inch stroke pump has low first cost, high reliability.

Aldrich air-driven hydraulic pumps operate on normal plant air. They are compact, simple to install, economical to operate. Write today for Data Sheet 36 (6-inch stroke) or Data Sheet 36A (3-inch stroke).

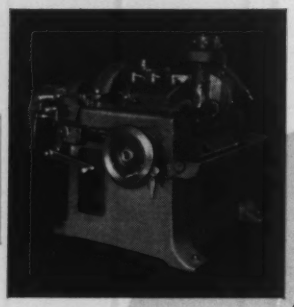
ALDRICH

ALDRICH PUMP COMPANY

8 PINE STREET, ALLENTOWN, PA.

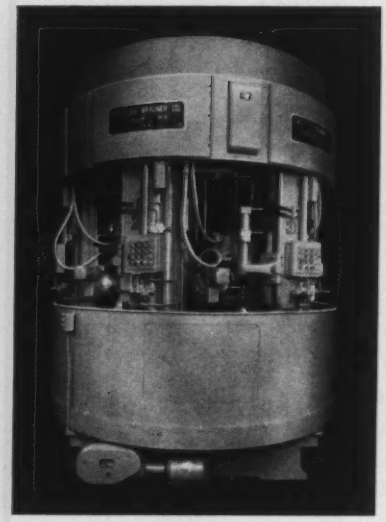
How long is it

FROM GOLDEN OPPORTUNITY...



50

TO GOLDEN ANNIVERSARY ?



Time-wise it is fifty years. Fifty of the most exciting, progressive years in our nation's history.

From a technical standpoint it appears much longer, so tremendous are the changes that have been wrought in the machine tools of today vs. those of yesteryear.

Men of vision incorporated the Lees-Bradner Company in October of 1909. They recognized the need for better cutting machines and grasped their golden opportunity to improve gear generating methods. Men of vision have carried on ever since, perfecting those early machines and winning for Lees-Bradner the most respected position in the hobbing machine industry.

Yes, we're fifty years young—and growing younger every year with fresh, new ideas that multiply the efficiency of Lees-Bradner machines.

Many thanks to our thousands of good customers who, years ago and since, gave us the "golden opportunity" to reach this, our "golden anniversary."

IMPROVING GEARS . . . FOR 50 YEARS!

the LEES-BRADNER *Company*

CLEVELAND 11, OHIO, U.S.A.

COMING EXHIBITS

Corrosion Show — March 14-18, Memorial Auditorium, Dallas. (National Assn. of Corrosion Engineers, 1061 M & M Bldg., Houston)

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

1960 Castings Congress & Exposition—May 9-13, Convention Hall, Philadelphia (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

MEETINGS

FEBRUARY

American Institute of Chemical Engineers—National meeting, Feb. 21-24, Biltmore Hotel, Atlanta, Ga. Institute headquarters, 25 W. 45th St., New York.

Industrial Diamond Assn. of America, Inc.—Annual meeting and convention, Feb. 22-25, Hollywood Beach Hotel, Hollywood Beach, Fla. Association headquarters, Box 175 Pompton Plains, N. J.

MARCH

Hoist Manufacturers Assn. — Annual meeting, Mar. 1, Hotel Cleveland, Cleveland. Association headquarters, One Thomas Circle, Washington, D. C.

Can Manufacturers Institute, Inc. —Annual meeting, March 7, Waldorf-Astoria Hotel, New York. Institute headquarters, 821—15th St., N. W., Washington 5, D. C.

Assn. of Iron & Steel Engineers—Western meeting, March 7-9, St. Francis Hotel, San Francisco. Association headquarters, 1010 Empire Bldg., Pittsburgh.

Manufacturers Standardization Society of the Valve & Fittings Industry — Annual meeting, March 8-10, The Barbizon-Plaza Hotel, New York. Society headquarters, 420 Lexington Ave., New York.

Aluminum Extruders Council—Quarterly meeting, Mar. 9-11, Arawak Hotel, Jamaica, W. I. Council headquarters, 1015 Chestnut St., Philadelphia.

National Assn. of Waste Material Dealers, Inc.—Annual convention, March 12-15, Waldorf - Astoria Hotel, New York. Association headquarters, 271 Madison Ave., New York 16, N. Y.

Fire Equipment Mfrs. Assn.—Annual meeting, March 15-16, Barbizon-Plaza Hotel, New York. Association headquarters, 759 One Gateway Center, Pittsburgh.

Society for Non-Destructive Testing —Third international conference, March 15-21, Tokyo, Japan. Society headquarters, 1109 Hinman St., Evanston, Ill.

FOR SUPER SERVICE STANDARDIZE 100% ON SOUTHERN FASTENERS

Southern Screw service is the best — day in, day out. But when Southern's "best" is not good enough — when you are faced with an immediate need for super service to keep production at top speed, Southern fills the bill then, too. Whether it's an air shipment from Southern's Statesville factory, or a rush order from one of our four strategic warehouse locations, Southern's service, like Southern quality, has earned an enviable reputation for dependability.

For service, for quality, for down-the-line dependability in all of your production operations, standardize on Southern—specialists in the manufacture of fasteners exclusively! Send your order to Southern Screw Company, P. O. Box 1360, Statesville, N. C.

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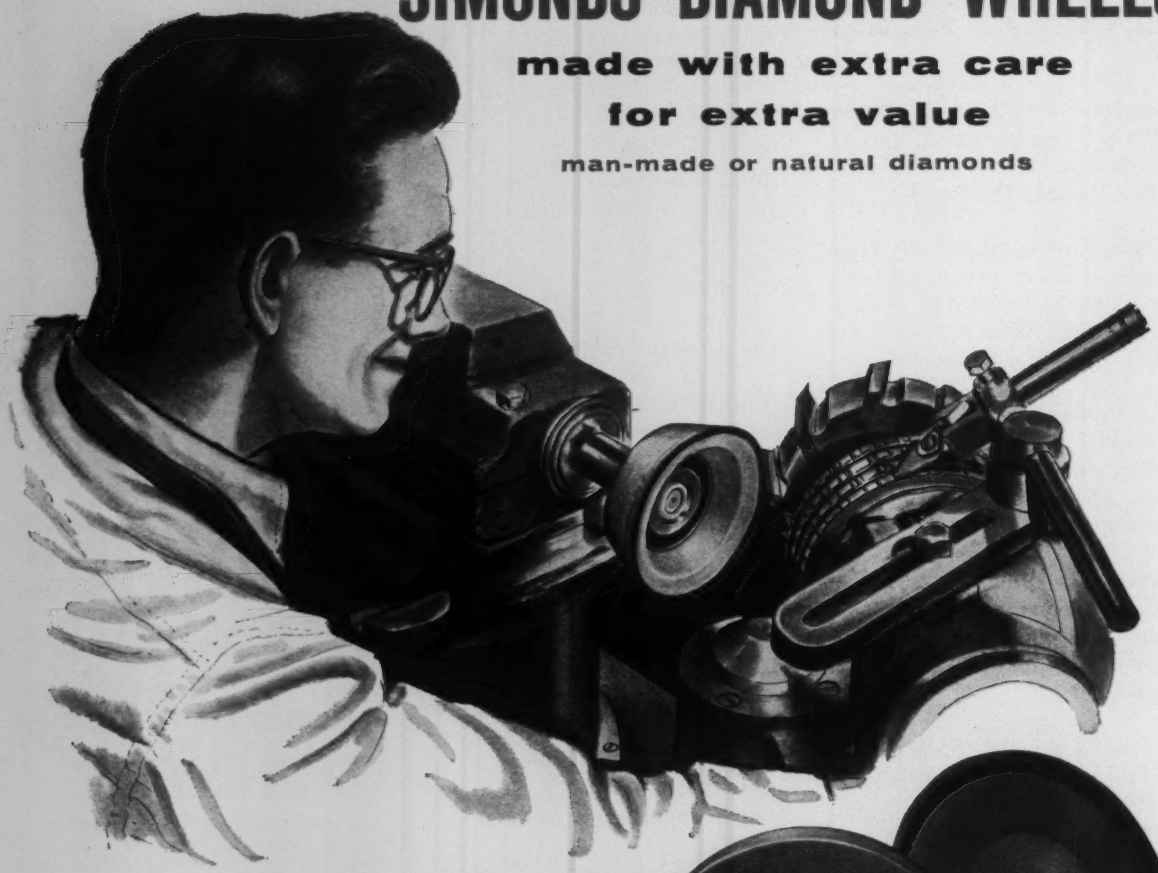
When the job calls for DIAMONDS... say SIMONDS

SIMONDS DIAMOND WHEELS

made with extra care
for extra value

man-made or natural diamonds



You get *extra* use from Simonds wheels because more of the diamonds are *productively* used for actual grinding. That's due to the extra care that goes into their manufacture . . . extra-demanding quality controls, modern techniques and the most accurate equipment . . . extra care that provides better balance and truer running, and consequently, fewer dressings. Special core material in resinoid bonded wheels also needs little or no dressing back as the diamond depth is consumed. Made with true and exact concentrations, and available in all shapes, sizes and bonds. Job-proved grain and grade specifications.
Send for catalog ESA-290.

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COUNT ON / YOUR SIMONDS DISTRIBUTOR / FAST SERVICE • LOCAL STOCKS

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The Youngstown Sheet and Tube Company Youngstown, Ohio

Youngstown

-growing force in steel

STEEL SCOPE

STEEL is ten thousand products. It is a desk in the Pentagon. A car. A dishwasher. A lawn mower blade. It is a gas line in Florida. 8000 feet of drill pipe in a Maracaibo oil well. A can of beer in your cooler. Or a reinforcing bar. No matter who you are or where you are, you benefit from the magic things men do with this inexpensive metal. You can live with steel. Work with it in any of its forms—sheet, pipe, strip or bar. Youngstown's Orange Band steels are exactly the type and shape and size you want. To specification. The many kinds and uses of Youngstown steels help make Youngstown a growing force in steel.

YOUNGSTOWN STEEL spans the hemisphere. Through 28 Youngstown offices—and through independent steel service centers, through 750 pipe distributors, 355 electrical jobbers, through 155 stores and offices of Continental-Emsco, and Fibercast (2 divisions of Youngstown)—the Orange Band brand serves all industry with steel, with service and new steel ideas for cost-conscious businessmen. In the oil patch, for example, Youngstown fields the largest staff of professional service engineers. Wherever there is a market for steel, you'll find the Orange Bands of Youngstown, symbol of quality, service and of a growing force in steel.

Youngstown - growing force in steel

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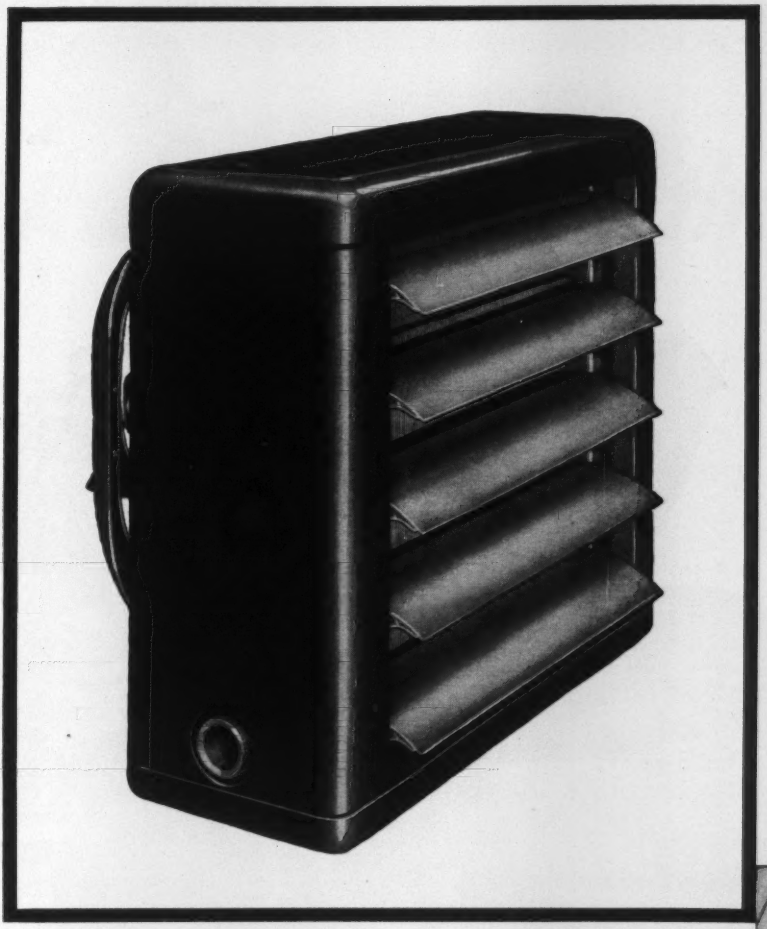
LOS ANGELES · MILWAUKEE · MINNEAPOLIS · NEW ORLEANS · NEW YORK · PHILADELPHIA · PITTSBURGH · ST. LOUIS · SAN FRANCISCO · SEATTLE · TULSA · WASHINGTON · YOUNGSTOWN



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Leak-Proof!

Economical!

Maintenance-Free!

Highly Efficient!

Ideal for High-Pressure "Spot-Heating" Installations!

"BUFFALO" BREEZO-FIN UNIT HEATERS

"Buffalo" Breezo-Fin Unit Heaters are your "best buy" for "spot-heating" applications in plants and commercial buildings. Flexible, economical and dependable, they are delivering peak performance in thousands of installations throughout the world.

Best of all, *leakage inside the unit is positively eliminated.* A one-piece, seamless copper tube extends from inlet to outlet ground joint. This provides absolutely leak-tight operation for steam pressures up to 250 pounds and 406° F. Special coils for higher pressures and temperatures can be furnished, on application, utilizing steam or hot water.

Other Breezo-Fin features include high-efficiency fans for quiet operation — streamlined, handsome appearance — fins designed for maximum radiation — sturdy construction for long, maintenance-free life — adjustable louvers to "spot" the heat exactly where it's needed. Available in 31 standard sizes from 16,000 to 497,000 BTU. Special larger packages also available for higher heating loads.

Be sure to investigate "Buffalo" Breezo-Fin Unit Heaters for *your* next "spot-heating" job. Contact your nearby "Buffalo" engineering representative, or write us direct for Bulletin 3137-E.

One of many "Buffalo" Breezo-Fin Unit Heaters installed in world's largest surgical dressings plant, equipped with special coils operating on 425° F hot water with 400 P.S.I. working pressure.

"Buffalo" products bring you the "Q" Factor—the built-in QUALITY that provides trouble-free satisfaction and long life.

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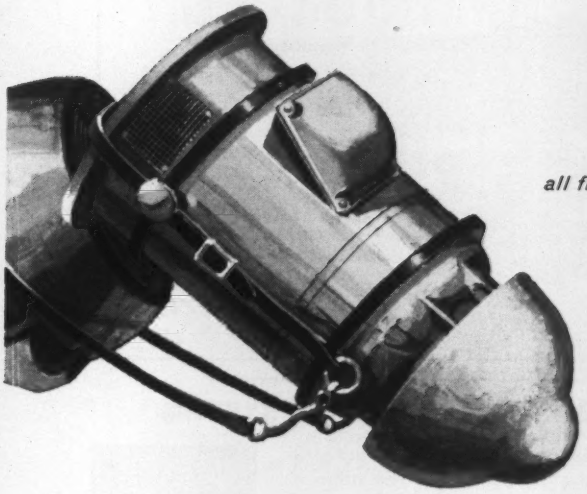
VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING • FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

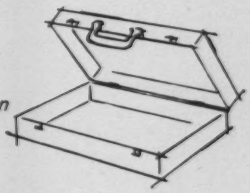
THE CASE OF THE
A. O. SMITH MOTOR MAN

A.O. Smith has the horses!



800 to 1 hp favorites for quiet operation, low maintenance and long-life service...

all from the case of the A. O. Smith Motor Man



The horses of A. O. Smith make up the dandiest remuda an integral motor user ever saw. A complete line of long-lived "easy keepers" — that includes...

SINGLE-PHASE DRIPPROOF INTEGRALS (1-5 hp). Tough rolled-steel frames have mountings harnessed to either old or new NEMA standards. Exclusive *sealed* starting switch keeps 'em running free and easy.

POLYPHASE DRIPPROOF INTEGRALS (1-800 hp). These front-runners are sound of wind, thanks to extra-value ventilation and insulation... sound of limb, thanks to extra care in electrical and mechanical design.

And A. O. Smith delivers the horses! Our motor man near you is on his mark with 24-hour action on all parts and service orders. He'll also show you a complete line of fractional-hp motors.

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Through research ...*a better way*

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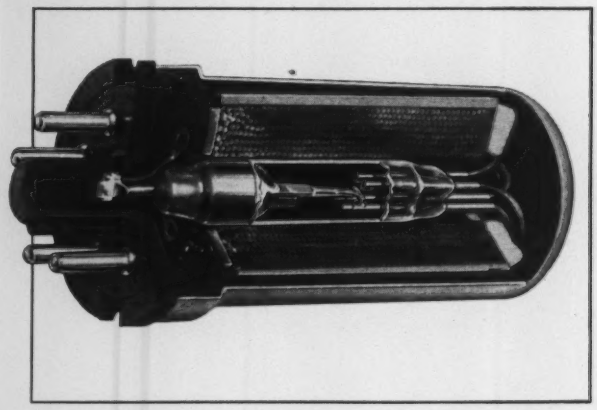
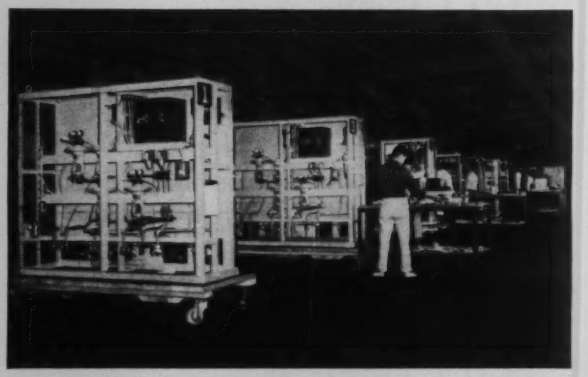
Milwaukee 1, Wisconsin, U. S. A.

C. P. CLARE'S MERCURY-WETTED CONTACT RELAYS PERFECTLY SEALED WITH GLASS-TO-METAL SEALING ALLOY

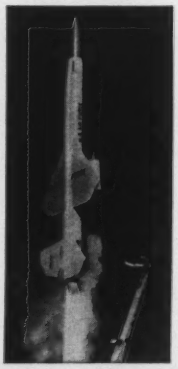
C. P. Clare & Company, Chicago, Illinois, produces a complete line of mercury-wetted contact relays characterized by long life, high speed of operation and no contact bounce. To supply relays that have a conservative life expectancy of more than a *billion* operations requires absolute perfection in all phases of manufacturing. C. P. Clare uses BISHOP's #52 alloy tubing for the critical tubular stems of these relays. Mercury and hydrogen at 150 psig are introduced through this connecting stem—which is then sealed off by welding and forging. Can glass-to-metal sealing alloys solve any of your problems? BISHOP makes a complete line . . . use the coupon for details.



TUBING TAKES 5,400 PSI IN HONEYWELL'S MISSILE CHARGING SYSTEM



Super pressure stainless steel tubing connects many components of the cubicles illustrated. Minneapolis-Honeywell's Missile Equipment Division, Pottstown, Penna. builds these control cubicles that make up the gas charging system for the Bomarc missile. BISHOP supplies Honeywell with two sizes of 304 seamless super pressure tubing for this application. During charging of the missile, tubing handles pressures up to 5,400 psi. If you use small diameter tubing—super pressure, commercial quality or other—consider BISHOP. Use the coupon for a copy of BISHOP's Tubular Products Bulletin.



J. BISHOP & CO.

platinum works

FOR HELPFUL DATA USE THIS HANDY COUPON

- ☐ Glass-To-Metal Sealing Alloy Data
- ☐ Tubular Products Bulletin No. 12
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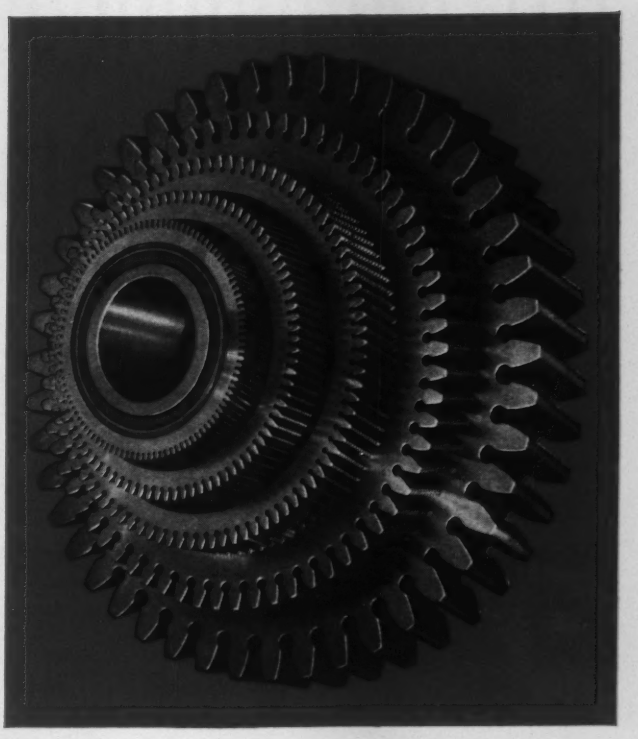
Products of all the Platinum Metals... Small diameter Stainless Steel, nickel and special alloy tubing

WHY RED RING GEAR SHAVING CUTTERS DO SUCH AN EXCEPTIONAL JOB



- Here are some of the reasons for the accuracy, for the job performance and the long economical service life of Red Ring Shaving Cutters.
- These cutters are engineered and produced by skilled specialists who have, for the past 27 years, devoted full time to shaving cutters, exclusively. Never underestimate this vast fund of experience which is unmatched anywhere else in the field.
- All Red Ring cutter grinding and cutter inspections are carried on in temperature controlled departments, for maximum precision. Where else is this done?
- Every Red Ring Cutter is made from a controlled specification forging—proper grain flow and uniform distribution of carbides in the tooth zone.
- Every Red Ring Cutter is heat treated in Red Ring furnaces under the direct control of Red Ring metallurgists.
- Every new cutter design is given a thorough performance try out in the Red Ring Gear Laboratory before it is released.
- Red Ring cutter engineers and service specialists are always available for consultation and to help a cutter customer in an emergency.

When you buy cutters, take advantage of these extra benefits. There is no extra cost.

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101 aluminum fabricators have ...Amchem's newest

ALODINE 1200S protects aluminum best ...at less cost, in less time!

To the hundreds of long-time users of Amchem Alodine—the first, low cost effective surface conversion treatment for aluminum—add a new host of fabricators who are employing the newest Alodine development—ALODINE 1200S!

If you are producing aluminum—any type of aluminum—you'll want to investigate the production advantages and profit potentialities of this new Alodine pre-paint process that provides constant, uniform quality as well as big savings in time, equipment and processing costs!

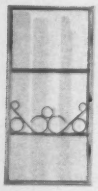
Through increased chemical activity ALODINE 1200S slashes processing time *up to 50 percent!* A 1200S system can be installed on your production line quickly and conveniently . . . and bath is maintained chemically . . . no special equipment required to control contamination! In an ALODINE 1200S system, products can be processed through continuous dip in the same time cycle other conversion coatings require for continuous spray lines! That means lower initial equipment and maintenance costs, wider range of product applications regardless of the application method—brush, dip, continuous strip or spray. ALODINE 1200S is qualified under Government Specification MIL-C-5541.

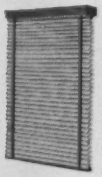
ALODINE 1200S is Amchem's positive answer to constant uniform quality in aluminum processing. Put its assured protection and production flexibility to work for your aluminum products and market them with greater confidence!

switched to Alodine 1200S conversion coating!

FASTER, LOW COST, EFFECTIVE AND FLEXIBLE, ALODINE 1200S IS PROVIDING NEW HIGHS

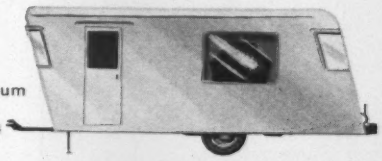
aluminum stop signs

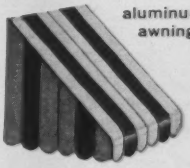

aluminum doors


aluminum venetian blinds

IN CORROSION RESISTANCE AND PAINT BONDING QUALITIES TO THESE AND

aluminum cameras

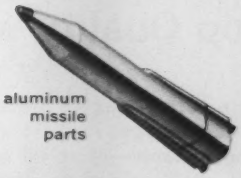

aluminum house trailers


aluminum awnings

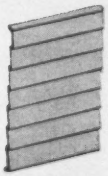
MANY MORE FINE PRODUCTS IN THE ALUMINUM INDUSTRY. YOU, TOO, CAN

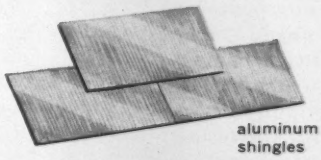
aluminum boats

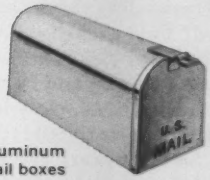
aluminum license plates


aluminum missile parts

UPGRADE YOUR PRODUCTS' CONSUMER APPEAL WITH ALODINE PROTECTION.


aluminum siding


aluminum shingles



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CONTACT YOUR NEAREST AMCHEM REPRESENTATIVE FOR COMPLETE DETAILS!

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ALODINE 1200S

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...top Quality with Economy

Republic Steel Lockers offer industrial management decided advantages in service and economy.

Big and roomy—interiors are well designed for convenience and ventilation. Strong and sturdy—made of steel to assure complete protection of personal effects and tools. Heavy-duty construction throughout.

Bonderized! This exclusive Republic feature provides a superior base for the baked-on enamel finish. Offers protection against rust and corrosion. Restricts bumps, scratches, abrasions of everyday service to the site of the injury. Reduces maintenance costs to a minimum.

Republic Steel Lockers are available with any of the popular locking devices. Handle is attached with a tamper-free Gulmite screw and lockwasher. Practically pilfer free.

Call your Republic-Berger representative. He will help you with your locker planning and assume full responsibility for complete installation.

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- ✓ ALL PARTS BONDERIZED
- ✓ 16-GAGE FORMED CHANNEL FRAME
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- ✓ POSITIVE LATCHING
- ✓ LOW MAINTENANCE

OK for purchase

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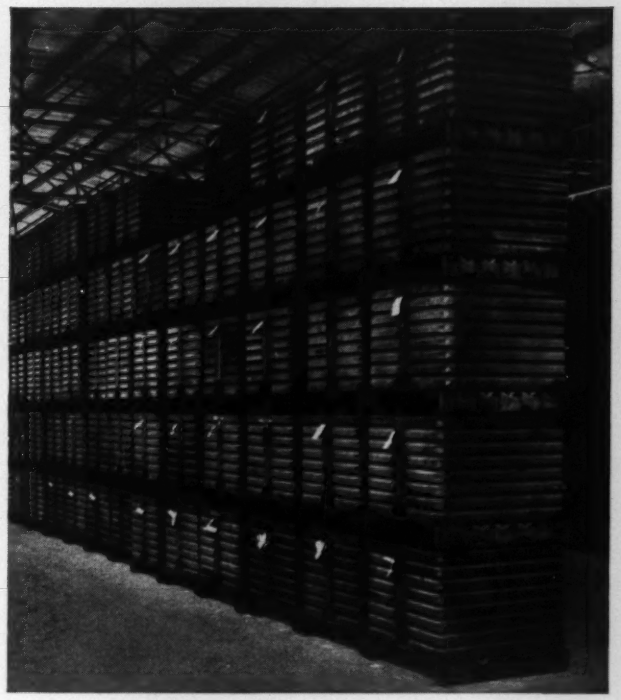
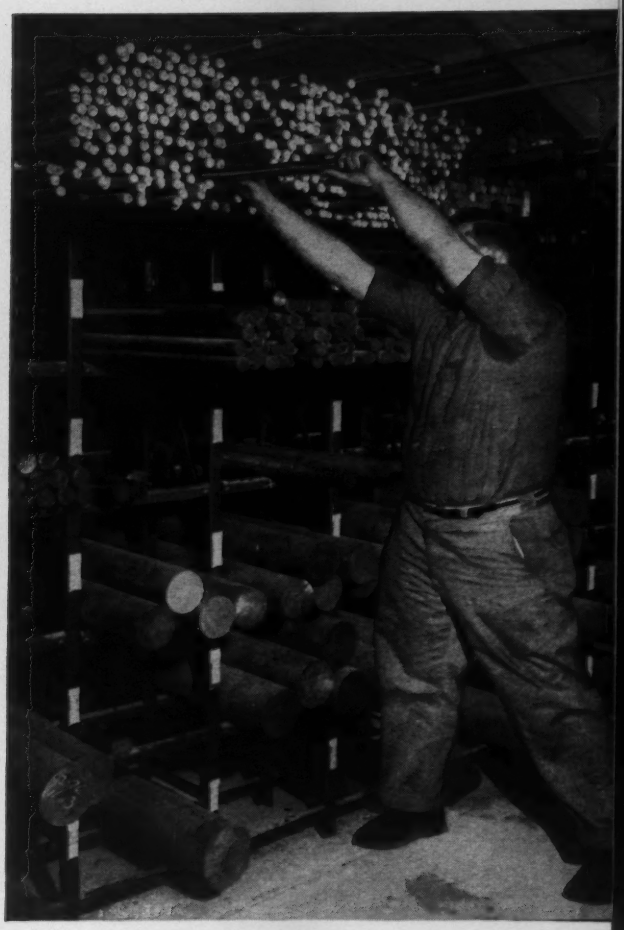


COMPLETE CONTAINERIZATION... Republic Box and Skid Units provide for multi-purpose service for delivery of semi-finished parts to production, feeding parts to machines, receiving finished parts as they come off the machining line, and storage. Complete production and inventory control from raw materials to finished products. Materials handling engineers will help you with your planning.

REPUBLIC WEDGE-LOCK® SHELVING is designed to handle heavy-weight storage. Wedge-Lock construction includes the three prime essentials of good shelving: 1. a post that will not bend, 2. a reinforced shelf that does not sag, and 3. a concealed sway-proof joint. Republic's Berger Division offers a complete line of shelving, storage units, and shop equipment to meet your needs.

REPUBLIC METAL LUMBER® solves framing problems fast. Simply measure, cut, assemble with ordinary bolt and nut fasteners. METAL LUMBER is fabricated from cold rolled steel to assure uniform physical properties, and high strength-to-gage ratio. Bonderized after fabrication for complete protection of all exposed surfaces. Available in two gages, two widths, in standard bundles of either 10- or 12-foot lengths. Write for more information.



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World's Widest Range of Standard Steels and Steel Products

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- ☐ Republic Steel Lockers
- ☐ Materials Handling Equipment
- ☐ Wedge-Lock Shelving ☐ METAL LUMBER

Name_____ Title_____

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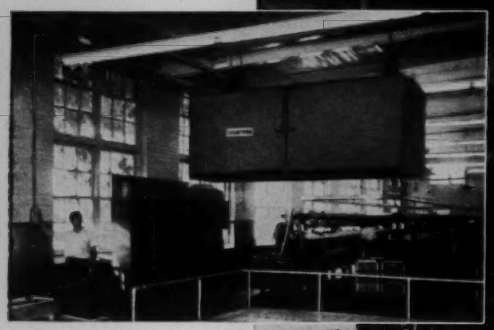
Address_____

City_____ Zone____ State_____

Automatic Handling System Brings **BIG SAVINGS**

Operates Between Buildings Without Operator

A Tramrail freight-carrying van leaving one building. Building doors open and close automatically. Tramrail track is high and above interference with railroad. The entire handling system is very safe.



Operator pushes wall button to start van on its way. Van rises until it reaches Tramrail carrier on track. Then carrier hauls van to building selected.

RAIN or shine, this Cleveland Tramrail system works without complaint. Inclement weather is of no concern, because no one has to go outside to operate this system.

The Tramrail freight-carrying van travels between buildings as directed by the touch of a pushbutton. It goes up and down grades and handles materials between different floor levels.

No regular operator is needed for this type of system. Usually the time required to dispatch loads is so little that production workers can do this along with their normal duties.

Great savings are made with Cleveland Tramrail automatic handling systems. They cut handling time enormously. They operate overhead above usual floor traffic and hindrances. They save floor space. They eliminate expensive floor repairs which floor conveyances make necessary. Tramrail equipment requires far less maintenance than usually is necessary with other types of conveying equipment.

Because the dividends are large and immediate when you install a Cleveland Tramrail automatic handling system, it will be to your interest to get the facts on what Cleveland Tramrail engineers can do for you.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

Write for free "Automatic Handling" booklet.

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4835 E. 290 ST. • WICKLIFFE, OHIO

SAVING TIME ON THE LINE

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PERMIT HOPPER-FED DRIVING OF LOCK WASHER AND SCREW!

There's an opportunity for real production-time savings in Sems. They're pre-assembled to eliminate handling of separate lock washers and screws on the assembly line . . . can be applied with a hopper-fed screwdriver for extra man-hour economies. Broad selection of types and sizes available. Inquire today.

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THE BLAKE & JOHNSON CO.
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CENTRAL SCREW COMPANY
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HARVEY HUBBELL, INC.
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LAKE ERIE SCREW CORP.
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THE NATIONAL SCREW & MFG. CO.
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REED AND PRINCE MFG. CO.
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REPUBLIC STEEL CORP. BOLT & NUT DIVISION
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RING SCREW WORKS
Warren, Michigan

ROCKFORD SCREW PRODUCTS CO.
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CANADA ILLINOIS TOOLS LTD. SHAKEPROOF/FASTEX DIVISION
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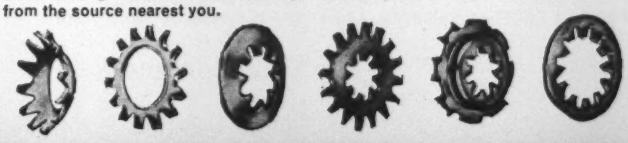
Specify SHAKEPROOF® LOCK WASHERS on Sems

Each Shakeproof Lock Washer is especially designed to insure a firm grip in a specific type of application. They come in a wide variety of styles and sizes—all engineered for mechanical pre-assembly. Save time . . . order from the source nearest you.



Sems
pre-assembled screw and lock washer
SEMS is a development of Illinois Tool Works, Chicago

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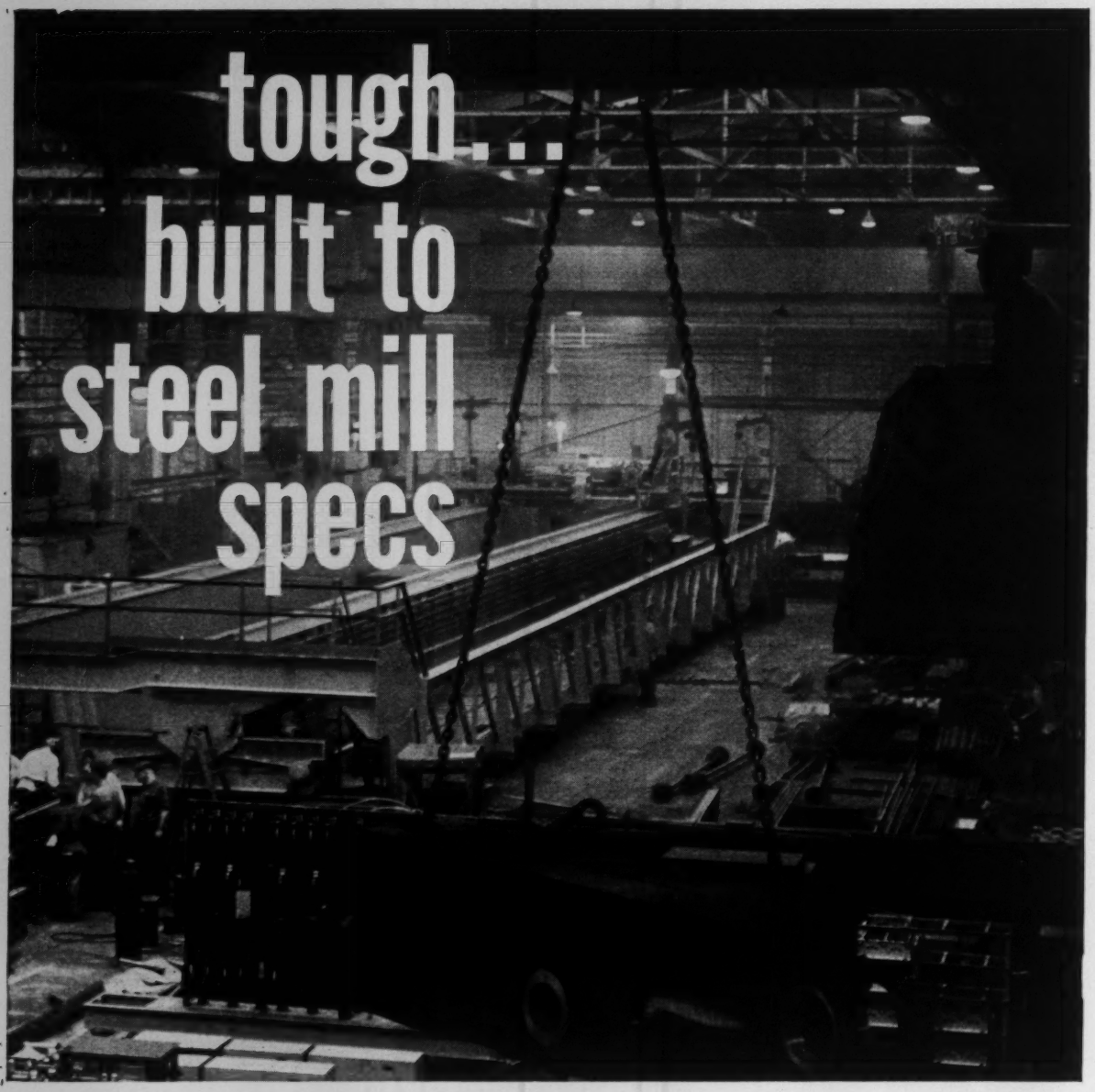
tough... built to steel mill specs



This tough 30-ton Whiting Tiger Crane with a 125′ span is thoroughly checked out on the assembly floor . . . then it's off to rugged, round-the-clock steel mill service. Whiting cranes for mill service easily meet the highest set of standards in all industry, A.I.S.E. specs, or are built to exacting customer requirements. And important Whiting extras like oil bath lubrication, herringbone gears, and long life antifriction bearings assure added years of efficient, dependable maintenance-free operation.

Whiting is your answer to every overhead handling problem. Write for the facts on "Whiting-Engineered Cranes," bulletin 80. *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.*

COST-SAVING EQUIPMENT . . . THE WAY TO HIGHER PROFITS

CRANES

WHITING

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT

FOUND!

A WAY TO DEGREASE MORE PARTS PER DOLLAR OF CLEANING COST

What makes the big difference in vapor-degreasing cost?

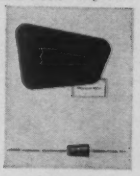
It's not what you pay for solvent. It's how long your solvent keeps working between degreaser cleanouts.

WHAT'S PSP? It means "permanent staying power." It's what you get with Nialk TRICHLOR. The stabilizer in this solvent doesn't wear out. You don't need to add fresh stabilizer when you degrease with Nialk TRICHLOR. You don't have to check the pH. The stabilizer stays with the solvent and keeps on protecting it. In the bath. In the vapor. Even after repeated distillation.

WHY IS PSP IMPORTANT? Users report substantial savings with this better, more stable trichlorethylene. Degreasers run without shutdown for weeks—even months longer between cleanouts, in many cases. Rejects are down sharply. Less solvent is needed, because less goes down the drain in unnecessary cleanouts.

To start saving in your plant—soon—see your Nialk TRICHLOR distributor. He can show you why your best buy is the solvent that doesn't wear out prematurely. Call him today.

NEW 36-PAGE BULLETIN explains fully how you get more and better vapor degreasing for the money with Nialk TRICHLOR. Shows basic types of vapor degreasers. Discusses cycles, operating procedures, stabilizers, causes of solvent contamination, solvent recovery, trouble shooting. Ask your distributor for a copy or write us.



Nialk® Trichlor, a product of

HOOKER CHEMICAL CORPORATION

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HOOKER CHEMICALS PLASTICS

Dann Goodson, *Manager Motor-Driven Compressor Sales, The Cooper-Bessemer Corporation, explains...*

How Cooper-Bessemer's new, compact Air Compressors simplify installation and reduce costs

The DMR compressors shown here are two models of a new line of *compact, 720 rpm* machines, unmatched in reliability. With these units, Cooper-Bessemer introduces a new standard of installation economy. So highly compact, the DMR compressors are readily installed in existing space, avoiding the need for additional housing facilities. They can be located at strategic points throughout the plant to supplement existing air line services without additional feeders to help supply your production needs at minimum cost.

The new DMR units come completely equipped with integral motor-drive and intercooler... ready for operation. Their control can also be integrally mounted as shown. They are available for two-stage applications in the range of 500 to 2000 cfm and discharge pressures of 80 to 125 psi... also for single-stage and three-stage operation.

The introduction of this new line of air compressors, plus the portable tool facilities of our new subsidiary, The Rotor Tool Company, enable Cooper-Bessemer to give you full-scope service for your industrial air power needs. Call the nearby Cooper-Bessemer office or air compressor agent for Bulletin No. 94 on the new DMR line.

BRANCH OFFICES: Grove City • New York • Washington • Gloucester • Pittsburgh
Chicago • Minneapolis • St. Louis • Kansas City • Tulsa • New Orleans • Shreveport
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Cooper-Bessemer International Corporation... New York • Caracas • Anaco
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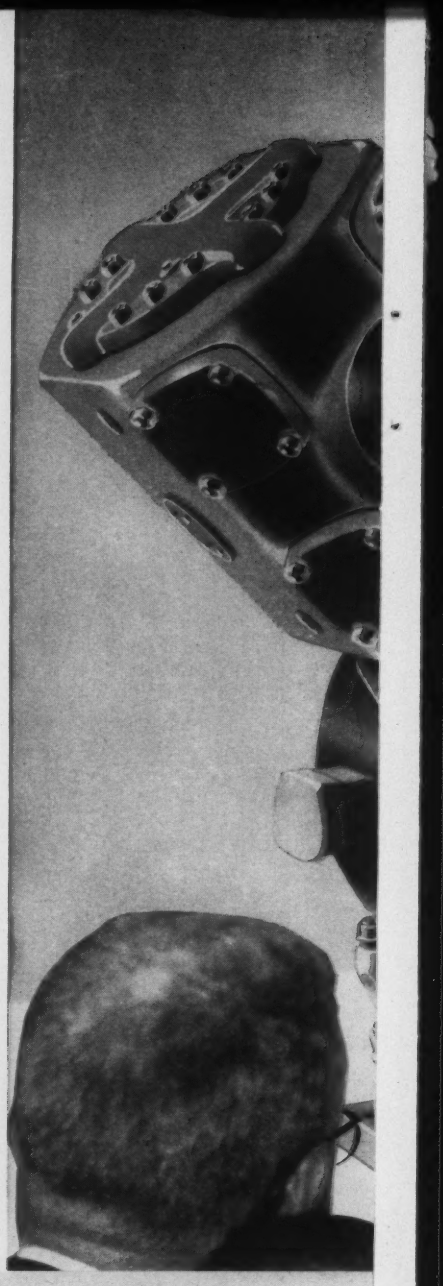
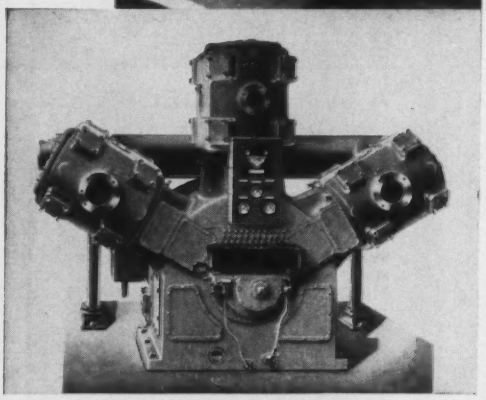
ENGINES: GAS • DIESEL • GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL,
ENGINE, TURBINE OR MOTOR DRIVEN

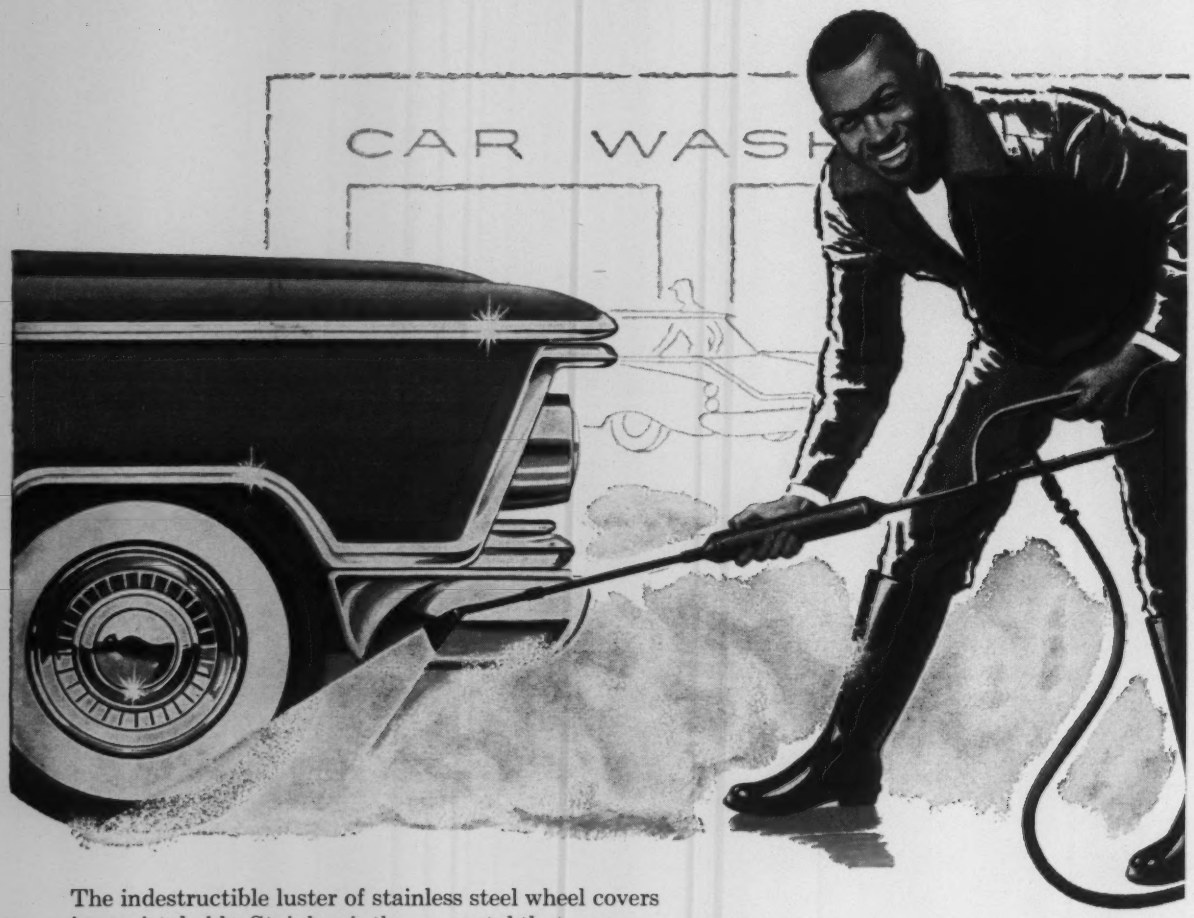




New DMR-3 two-stage air compressor with integral control. Ratings of 300-350 hp.

NEW
COOPER-BESSEMER
DMR-2 TWO-STAGE
AIR COMPRESSOR
WITH
EN-TRONIC CONTRO
100 TO 250 HP

"Man...that Stainless Shines!"



The indestructible luster of stainless steel wheel covers is unmistakable. Stainless is the *one* metal that never betrays a car's mileage . . . or age. The highway's abrasive grit, winter's salted streets, and even harsh detergents and steam can't corrode, etch or dim its beauty.

High quality Uniloy Stainless Steel, now being produced in one of the world's most modern mills, is rolled to your exact specifications. Specify Uniloy Stainless Steel for automotive trim that stays showroom new—forms and fabricates to the designers will.

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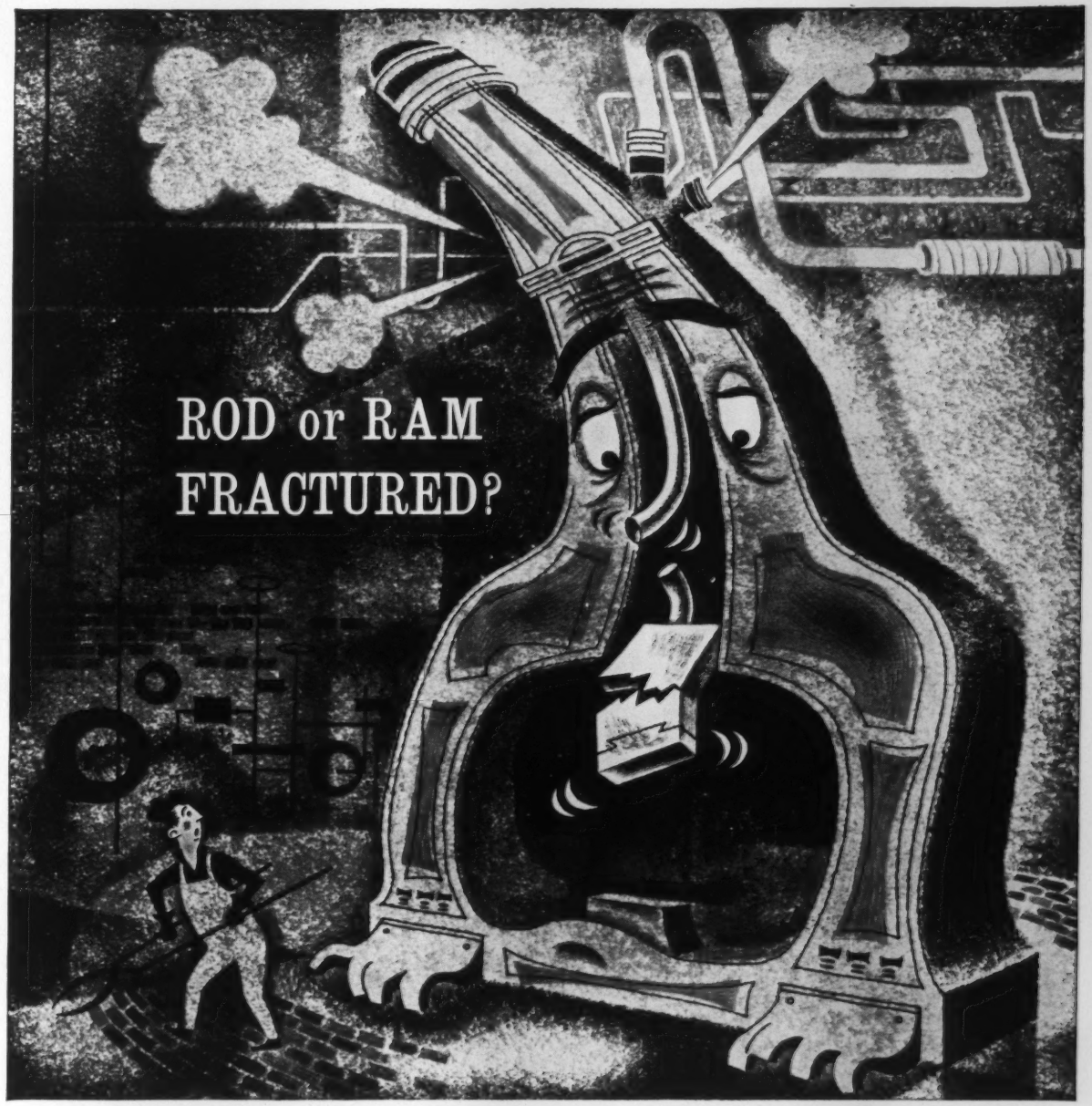
STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS



Call ERIE FOUNDRY for forging hammer replacement parts to your specifications

Replacement rods and rams, and many other parts for a wide variety of forging hammers of most any make are available from Erie Foundry. They are high in quality, competitive in price.

For over 65 years Erie Foundry has specialized in the design, development and manufacture of forging hammers of all types. Logically, then, Erie Foundry is a sure source for repair parts equal in quality and performance to the original equipment. Substantial inventories assure you of prompt service.

For more information on repair parts or our complete Rebuilding Service, write Mr. James Walker.

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ONE OF THE GREAT NAMES IN FORGING SINCE 1895

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Manufacturers of Forging Hammers • Forging Presses • Hydraulic Presses • Trimming Presses

EF-60-01

In ultra-modern heat-treating facilities is making the metal that meets a nation's growing appetite for strong, tough aluminum alloys

Olin Aluminum has completed a major expansion of its sheet production capabilities . . . is now turning out heat-treated and heat treatable alloys to meet Federal specifications for quality, analysis, temper and strength.

If you're considering high strength alloys, let Olin Aluminum metallurgists, engineers and design experts work with you to pinpoint the right sheet, extrusion or casting alloys and finishes for your applications.

Let us show you, too, how firms like yours are finding new markets ...developing new products...with the strong-as-steel material that's light and bright, but rugged enough for the most punishing applications. *See Edward R. Murrow on "Small World" — every Sunday Evening — CBS-TV.*

OLIN ALUMINUM IS HEAT-TREATED

	SHEET THICKNESS: .012" through .250"*	
ALLOYS	TEMPERS	WIDTHS**
6061	Flat Sheet: O, F, T4 & T6	3" to 60"
	Coiled Sheet: O & F	1" to 60"
ALCLAD 6061	Flat Sheet: O, F, T4 & T6	3" to 60"
	Coiled Sheet: O & F	1" to 60"
2024	Flat Sheet: O, F, T3, T36 & T86	3" to 60"
	Coiled Sheet: O & F	1" to 60"
ALCLAD 2024	Flat Sheet: O, F, T3, T36 & T86	3" to 60"
	Coiled Sheet: O & F	1" to 60"
7075	Flat Sheet: O, F & T6	3" to 60"
	Coiled Sheet: O & F	1" to 60"
ALCLAD 7075	Flat Sheet: O, F & T6	3" to 60"
	Coiled Sheet: O & F	1" to 60"

*Alclad 6061 not available in thicknesses less than .032

**Minimum width in "0" temper—6 inches

PLATE THICKNESS: up to 10"

LENGTHS

" to 288" depending on thickness

" to 288" depending on thickness

" to 288" depending on thickness

" to 288" depending on thickness

" to 288" depending on thickness

" to 288" depending on thickness

Most heat treatable alloys available subject to special inquiry

OLIN ALUMINUM®

NOW SHIPPING STRONG ALLOY SHEET

Call fast-moving Olin Aluminum today and find out what **service** really means. Check the Yellow Pages for your local Olin Aluminum representative or for off-the-shelf service from our distributors.

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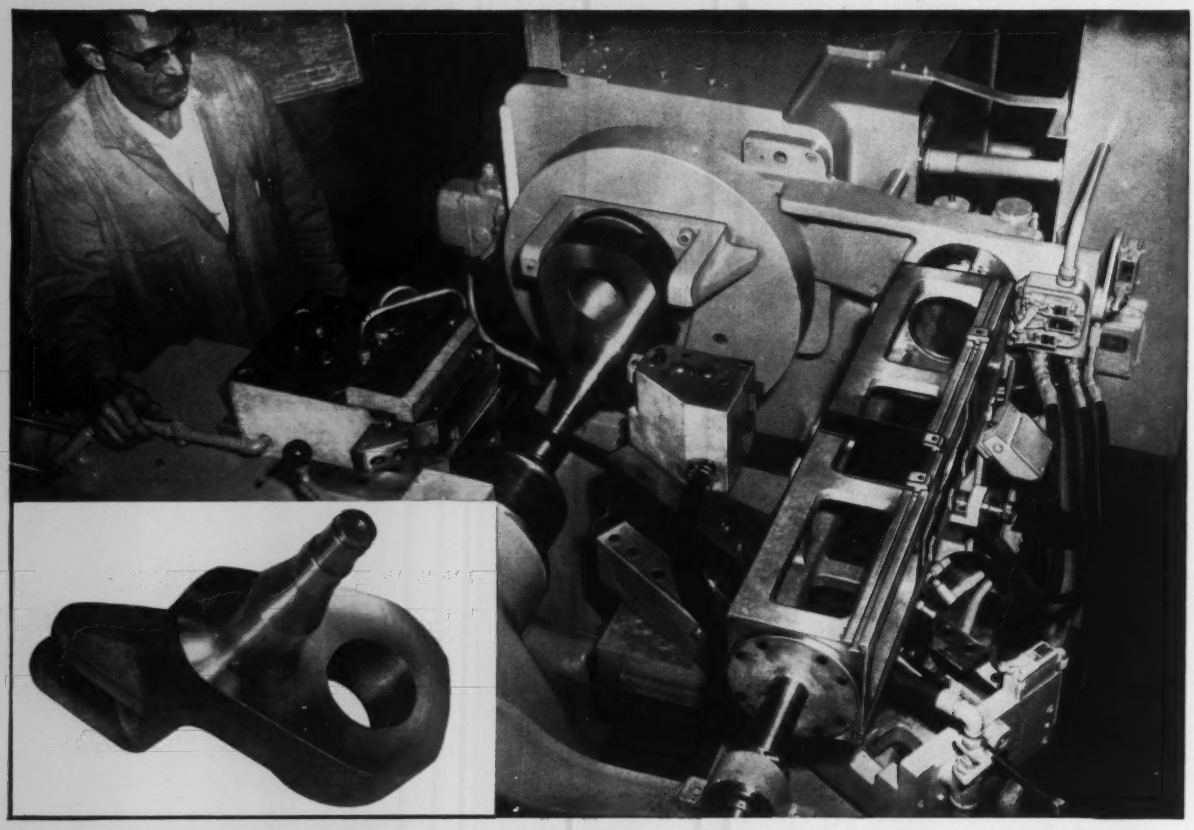


Whips problem part with right equipment

Handles tough, interrupted cut and contour machining easily with Gisholt No. 24 Automatic with JETracer

Here's how this producer is holding floor-to-floor time on military tank idler arm forgings—18″ long with 5½″ major radius—to just 21.1 minutes.

The job is done with the powerful Gisholt No. 24 Automatic Production Lathe, using a JETracer on the rear independent slide, plus a 2-speed motor for correct machining speeds when facing and turning.

With the part held between centers, a special face plate fixture locates the work and drives against the large O.D. radius. All cuts are made separately; each slide performs a rough and finish pass. The front tool slide faces at 60 r.p.m. and .015″ feed (306 f.p.m.) and has automatic tool relief. Two tools divide the length of cut to shorten machining time. A special step-over cam arrangement repositions the front carriage and its tools for the finish pass.

The JETracer uses a 4-position indexing cam roll (permitting up to 4 automatic passes if needed), and controls the rear slide which turns all diameters on the idler arm at 180 r.p.m. and .015″ feed (259 f.p.m.).

Whatever your production picture on large parts—long steady runs or small repeat lots—you'll find proven ways to cut costs with the Gisholt MASTERLINE No. 24 Automatic Production Lathe. One operator handles 2 or more of these powerful machines, or does other jobs during machining time, because all machine functions are automatically controlled. Setups and change-overs are fast and simple.

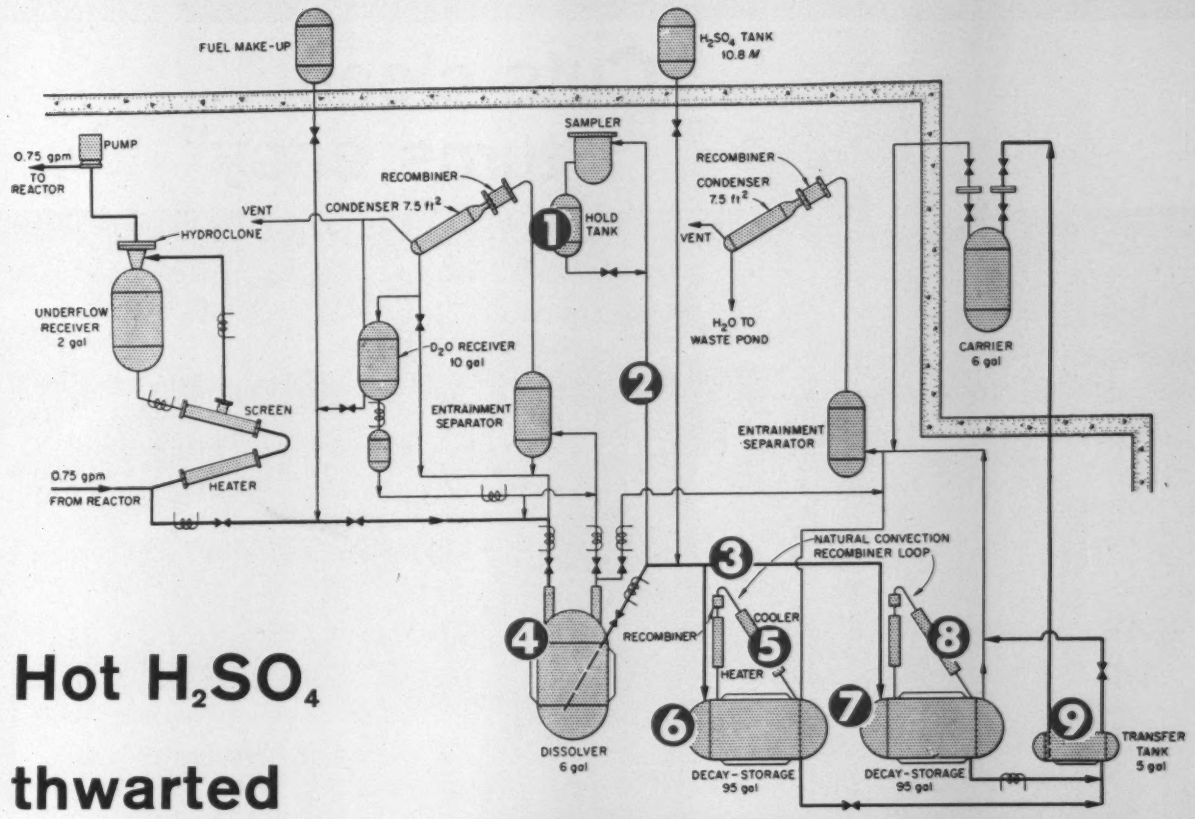
For complete details on the No. 24 and other Gisholt machines, call your Gisholt Representative today. He has the facts, and his wide experience may point the way to more profitable production in your plant.

MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS



Hot H_2SO_4 thwarted on 9 fronts by Carpenter No. 20Cb*

● With the process diagrammed above, insoluble corrosion and fission products are removed from enriched uranyl fuel by the use of hot sulphuric acid. Purification of the fuel is accomplished by centrifugal separation in a hydraulic cyclone operated at reactor temperature and pressure.

Continuity of this process has to be amply fortified against the ravages of the hot acid. And it is—with Carpenter Stainless No. 20Cb. All tanks, coolers, process lines and other equipment in contact with the H_2SO_4 solution at 100° F to boiling are made of this super corrosion-resistant alloy. Long-life, low-cost corrosion control is thus assured in this process.

Is sulphuric acid or other strong corrodents eating up costly equipment and production time in your plant? Then it's time to put Carpenter Stainless No. 20Cb on the job and put a cost-saving end to your trouble for a long time. This best single answer to most severe corrosion problems is available in eight different forms.* Contact our nearest office or distributor for technical data, prices and delivery. Ask for Bulletin 108A. The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

*

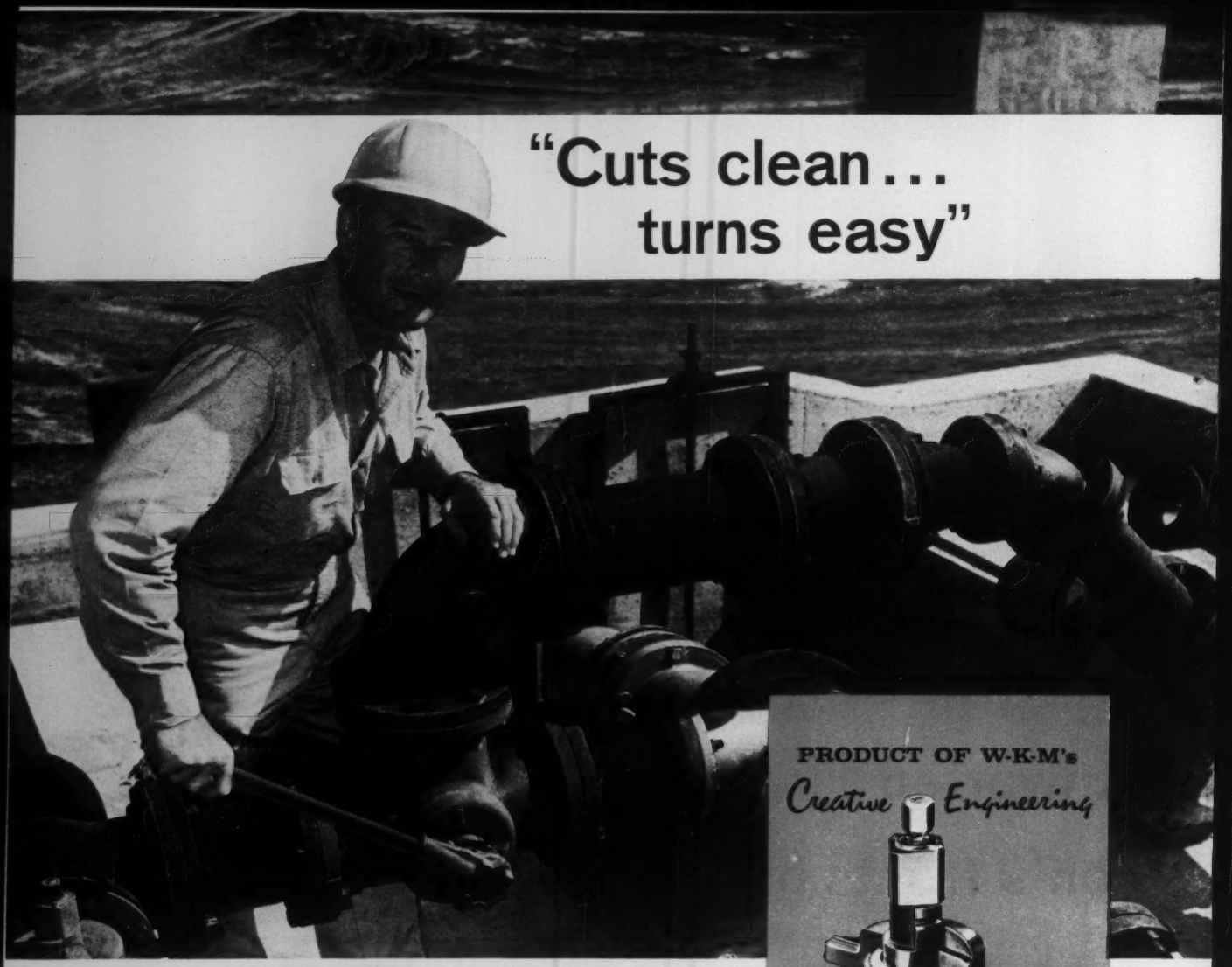
Available from stock

Your orders for sheet, plate, pipe, tubing, strip, bars, wire and billets of Carpenter No. 20Cb can be filled promptly from warehouse stocks.

...at new lower prices

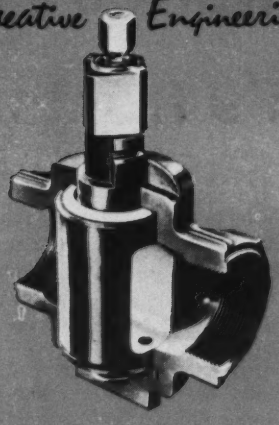
your master key to cost-saving corrosion control

Stainless No. 20Cb



"Cuts clean... turns easy"

PRODUCT OF W-K-M's *Creative Engineering*



acf® Lubricated Plug Valves

The shearing action of the ACF valve's cylindrical plug cuts tough, stringy slurries clean as a knife . . . with a quick, easy quarter-turn.

Full pipe area in both round and rectangular port valves provides through-conduit flow with minimum turbulence and pressure drop. The cylindrical plug can't stick or wedge, can't be unseated.

ACF Plug Valves are perfect for sewage, mining slurries and other heavy ladings. Specify them. You'll get outstanding performance. *Available from leading suppliers everywhere.*

WRITE FOR CATALOG 400

W-K-M

DIVISION OF acf INDUSTRIES
INCORPORATED
P. O. BOX 2117, HOUSTON, TEXAS

ACF semi-steel lubricated Plug Valves feature Teflon head seat gaskets, uniform lubrication of all friction surfaces.

Materials: steel, semi-steel, Ni-resist, carbon steel, bronze, aluminum.

Sizes: ½" through 30".

Working Pressures: 125 through 800 pounds.

5916-R

I-R Size 810 IMPACTOOL
¾" Square Drive

NEW DESIGN FASTER SPEED GREATER POWER

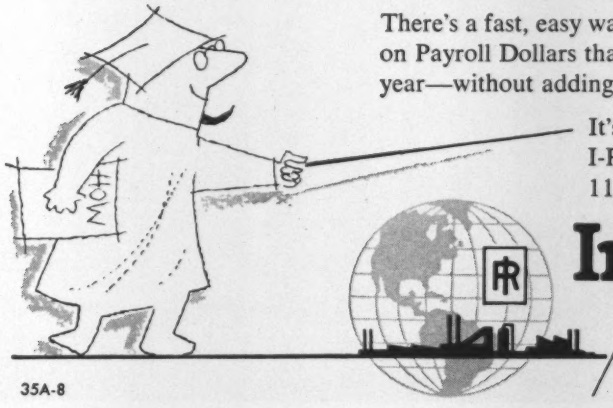
. . . to give you an

ANNUAL DIVIDEND ON PAYROLL DOLLARS!

If your operators are using older model Impactools on fastening operations, you can increase their man-hour productivity by as much as 750 Payroll Dollars in one year, just by replacing the older tools with brand new I-R 810 Impactools.

Multiply these Annual Dividend Savings by the number of Impactool operators in your plant, and you can see why management today is taking a new look at portable tool operations.

There's a fast, easy way to calculate the amount of Dividend Savings on Payroll Dollars that new I-R Tools can help you earn in just one year—without adding to your present payroll.



It's yours without obligation. To get it, call your I-R AIRengineer today. Or write Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

Ingersoll-Rand

Tools plus AIRengineering increase output per man

35A-8

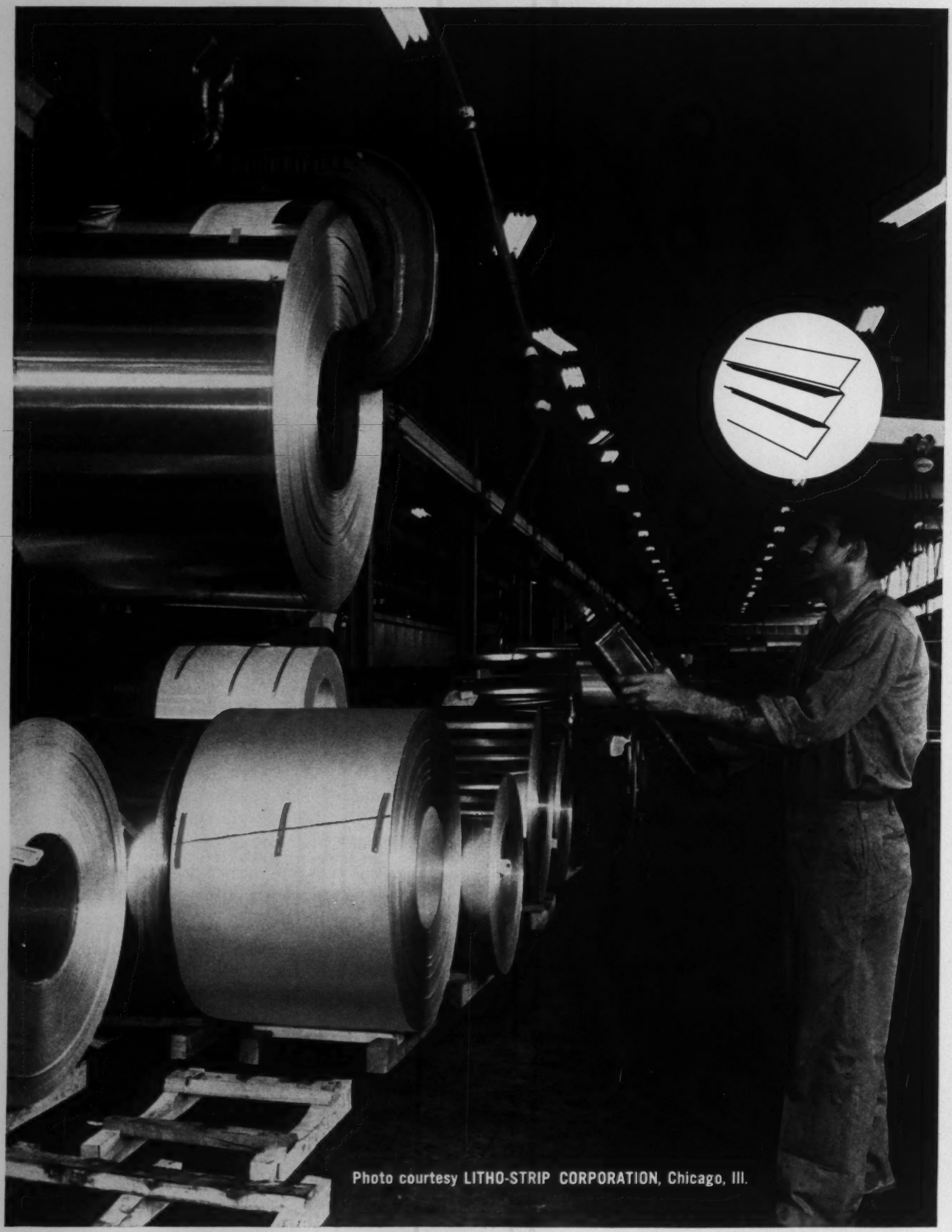
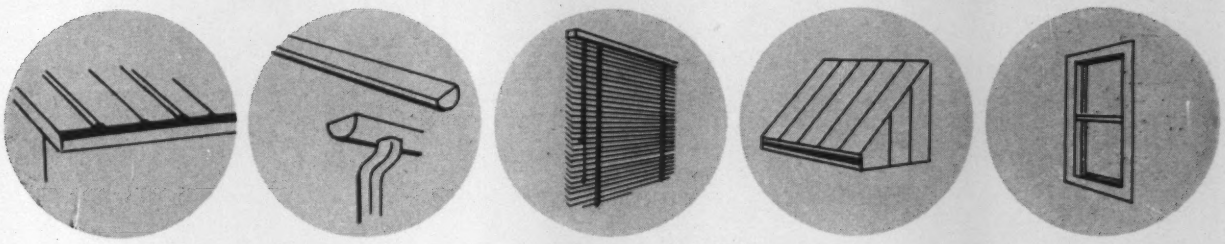


Photo courtesy LITHO-STRIP CORPORATION, Chicago, Ill.

BONDERIZED ALUMINUM

makes your painted products look better longer



Most famous of all surface treatments for metals—BONDERITE—makes painted aluminum look better longer.

Bonderite on aluminum means fine appearance longer, because it controls corrosion and anchors the paint.

Bonderized and painted aluminum is produced on automated strip lines in which the metal is cleaned, Bonderized and painted, then re-coiled ready for use.

Stamped or roll-formed products are made from pre-painted, Bonderized aluminum coil without loss of paint adhesion, even from the most severe deformation. Here's production efficiency and economy at its best—better products at less cost.

Many Applications of Bonderite for Aluminum

There's more than one type of Bonderite for use on aluminum. In wide use is Bonderite as a base for paint, which adds durability and long life to paint finishes on so many aluminum products.

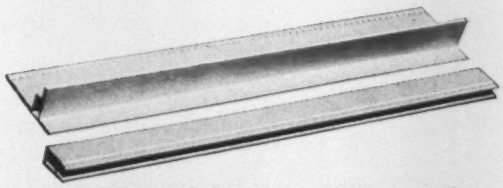
Another Bonderite produces an attractive green coating, used on many architectural products without further finish.

Protection without changing the characteristic color of the metal is provided by another Bonderite.

There is also a Bonderite, formulated for mixed production, which coats aluminum, steel and zinc.

Bonderite for aluminum meets and exceeds the requirements of Government Specification MIL-C-5541.

Well over two hundred plants—large, medium-sized and small—use these great Parker products on their aluminum production. Better investigate for *your* plant, today!



Aluminum window and screen frame sections Bonderized, painted and formed after painting. No breaks in finish anywhere! (Courtesy, Security Co., Detroit, Mich.)

SEND FOR ILLUSTRATED BULLETIN!—*Free bulletin, with more complete information and details, mailed immediately upon request. Ask for Bulletin A6790, "Bonderite for Aluminum."*

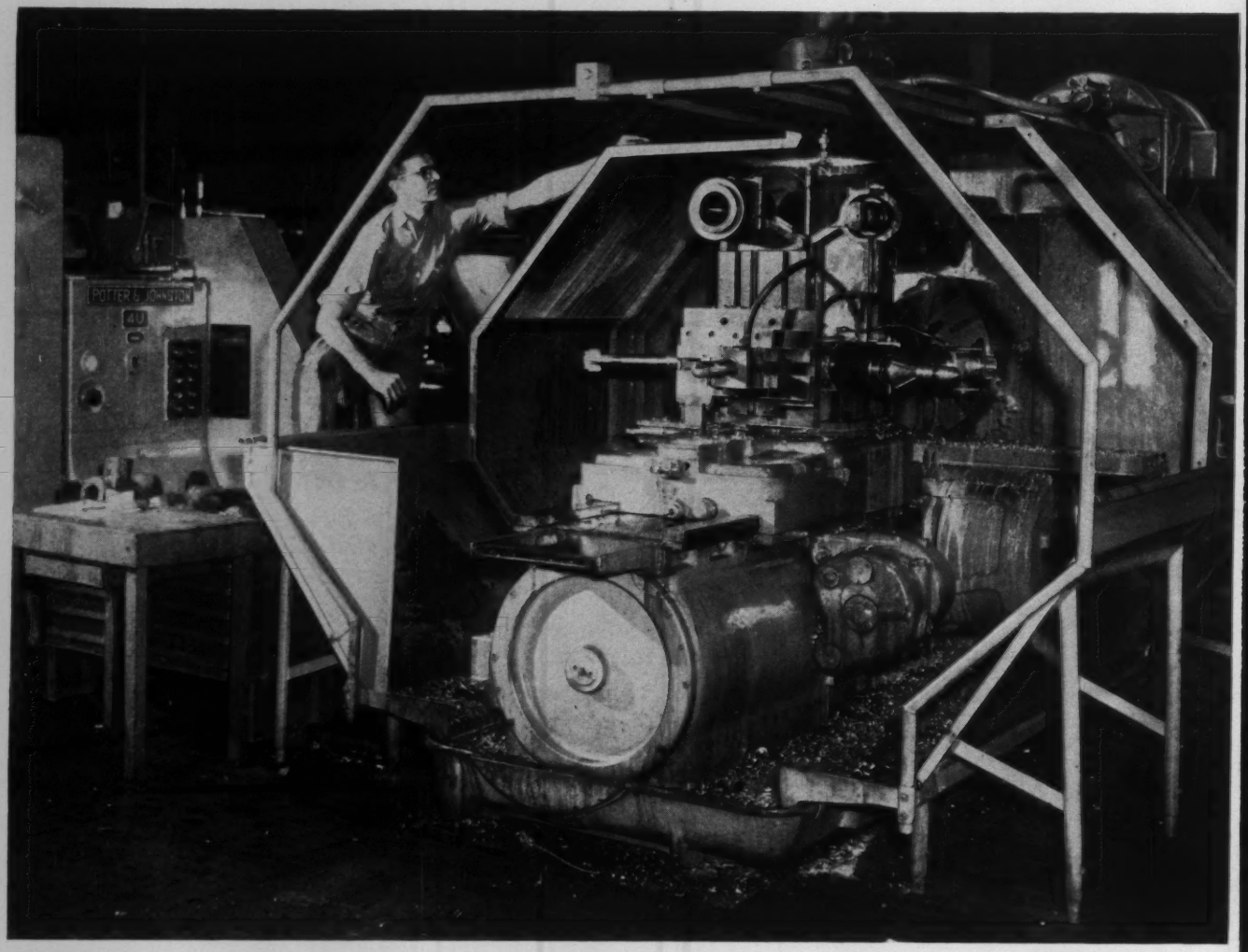
Parker Rust Proof Company

2197 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base	BONDERITE and BONDERLUBE aids in cold forming of metals	PARCO COMPOUND rust resistant	PARCO LUBRITE—wear resistant for friction surfaces	TROPICAL—heavy duty maintenance paints since 1883

**Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.*

"Valve Bodies machined



JOB FACTS

THE PART: Plug Valve Body

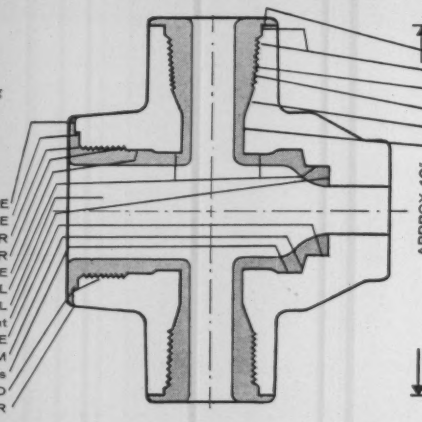
MATERIAL: 4140 Steel Casting, 287-301 Bhn

REQUIRED: A total of 33 roughing and finishing cuts, involving very heavy metal removal.

THE MACHINES: A Potter & Johnston 6DREL-40 and a Potter & Johnston 4-U.

FIRST OPERATION

FACE
FACE
CHAMFER
FORM CONTOUR
COUNTERBORE
STEPPED CORE DRILL
PILOT BORE FOR DRILL
FACE, Single Point Cut
BORE
FACE BOTTOM
FORM CONTOURS, Single Point Cuts
STRAIGHT THREAD
CHAMFER



SECOND OPERATION

FACE, Single Point Cuts
STEPPED CORE DRILL
FORM TAPER, Single Point Cut
TAPER THREAD
FORM CONTOUR, Single Point Cut
CORE DRILL

THIRD OPERATION

(Index and repeat operation on opposite end.)

THE RESULTS

A part completed every 6½ minutes - a time saving of 80% over previous methods. The first operation is performed on one machine. While this is working, the other machine is loaded, and the second and third operations are completed.

SHADED AREAS INDICATE METAL REMOVED

in One-Fifth the time

...plus attractive savings in set-up time!"

Two Potter & Johnston Automatic Turret Lathes . . . a Model 4-U and a Model 6DREL-40 recently installed in the Mission Manufacturing Company's plant at Houston, Texas . . . are now producing plug valve bodies in 20% to 50% of the time previously required using hand turret lathes. Widely used in oil field and chemical industry applications, these valve bodies are machined from heavy steel castings. The multiple machining operations require very heavy metal removal, demand close tolerances and, in addition, involve the generating of complex internal contours. Looking for a means of speeding up these machining operations, Mission investigated Potter & Johnston and other makes of machines. P&J Automatics were finally selected, because they are sturdier and heavier and because of the extreme savings in the set-up time for the various jobs. Other factors influencing Mission's choice include the accuracy of the P&J Machines, the savings in floor space made possible by their high output-per-area, and the fact that their completely automatic operation insures greatly increased production per man-machine hour.

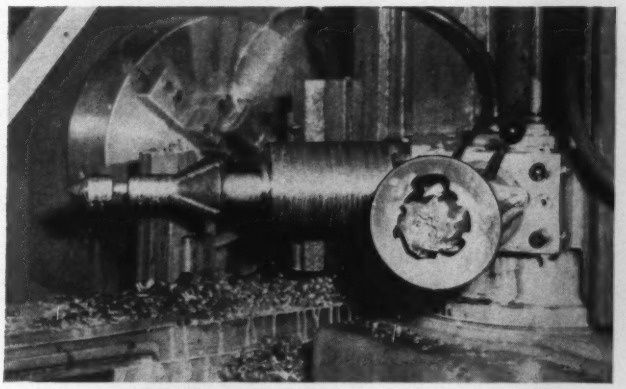
Combining extra power and rigidity for fast metal removal with the versatility needed to handle complex multiple cuts with speed and efficiency, Potter & Johnston Automatics can increase productivity and cut costs at your plant the same way they have at the Mission Manufacturing Company. For the dollars-and-cents facts, ask for production estimates on your jobs. Call the Pratt & Whitney Branch Office in your area or write direct, outlining your production needs.

PRATT & WHITNEY COMPANY, INC.,
10 Charter Oak Boulevard, West Hartford, Conn.

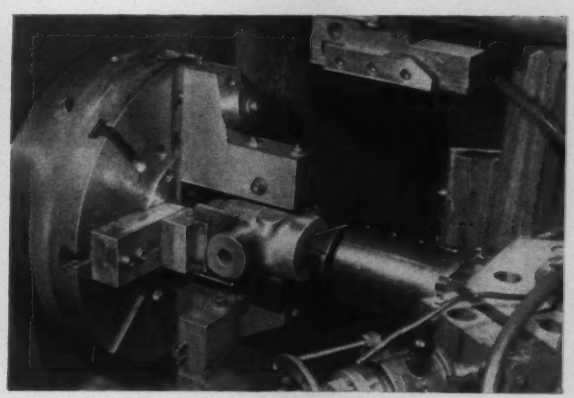
POTTER & JOHNSTON AUTOMATICS
MANUFACTURED BY

100th Anniversary 1860 1960

PRATT & WHITNEY®
FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS



Heavy metal removed fast . . . contributes to the important time savings realized on this job. Heavy cuts like this require unusually powerful, rigid machines, like the P&J 6DREL-40 and 4-U.



Important savings in set-up time . . . are realized because this tooling, designed by P&J Specialists working with the manufacturer, incorporates an unusual degree of versatility and adaptability.

FUJI'S QUALITY STEEL

L CO., LTD., a giant
nakers, has made vast
chievement of per-
es of iron and steel
STEEL products can
because rigid control
er quality at all essential

FUJI IRON & STEEL CO., LTD.

hashi, Tokyo, Japan.
ELFUJI TOKYO

Ajax Magnethermic supplies all types of Induction Melting Furnaces including: core, coreless, lift and automatic pouring. Vacuum melting and degassing applications are among their many uses. 60 cycle, motor generator, mercury arc converters, R. F. generators and the new 180 cycle Multiductor, all products of AM, are available as the power source.

THE NEW NAME WITH THE FAMILIAR RING!

Induction Melting Furnaces from 8 ozs. to 8 tons capacity,
one of many product lines of AM,
pioneer builder of induction heating equipment since 1920.

"induction heating is our only business"

Magnethermic CORPORATION

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P. O. BOX 839
Youngstown 1, Ohio

TRENTON DIVISION
930 Lower Ferry Road
Trenton 5, New Jersey

YOUNGSTOWN DIVISION
3990 Simon Road
Youngstown 1, Ohio

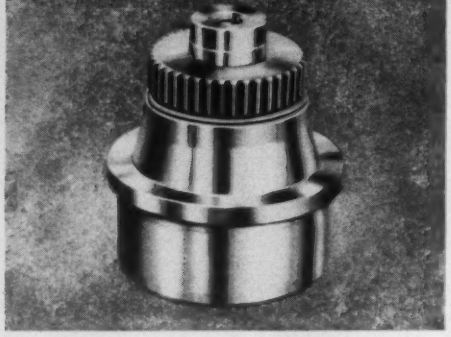
UNBRAKO

INDUSTRIAL FASTENERS like this Socket Head Cap Screw are produced to a dynamic reliability standard as a result of SPS research. The SPS line includes a limitless variety of self-locking screws, locknuts and precision fasteners for everything from massive machinery to the most minute products.

SPS AIRCRAFT

AIRCRAFT/MISSILE FASTENERS like this bolt are produced to ultra-high performance standards at SPS. Today's lightest, strongest fasteners in standard and special designs are products of SPS. Research and development work includes titanium, beryllium and other light-weight, high-strength exotic metals.

SPS NUCLEAR

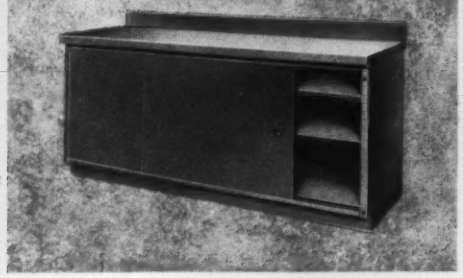


NUCLEAR COMPONENTS like this cap for a core housing are held to almost unbelievable dimensional tolerances. The nuclear energy field depends on SPS for threaded fasteners, control rod drive mechanisms, motor tubes, core components, instrumentation housings and many other essential parts.

SPS RESEARCH is

Photoelastic study on a Polariscope in the SPS Laboratory for advanced research proves that new UNBRAKO *Hi-Life Thread Root distributes stresses evenly over a large, smooth radius, doubling fastener fatigue life and increasing tensile strength.*

HALLOWELL

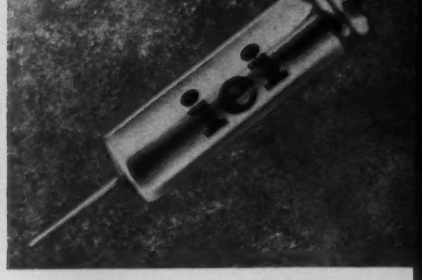


SHOP EQUIPMENT for industry and schools is made to the same superior quality standards as other SPS products. The Hallowell line offers broad coverage of standard and special needs in work benches, shelving, and similar equipment. Ruggedness and space efficiency are well identified with Hallowell.

COLUMBIA

OFFICE FURNITURE like this handsome Columbia Nine-to-Five unit sets an office apart with distinctive styling and color combinations. The complete line includes efficiently designed, durable steel office furniture, plus special units, a wide choice of smart chairs, filing cabinets and accessories.

I. E. I.



CAPACITORS FOR ELECTRONICS bearing the IEI trademark are widely used for subminiature circuitry and transistorized applications. This SPS company makes both aluminum and tantalum capacitors, including the lightest and smallest per given capacitance in the industry, to the highest quality standards.

rewriting the book on threads

Out of the SPS laboratory has come a whole new concept in thread design. Engineers created a radiused thread root based on known laws of stress. A precision contour now eliminates sharp corners, or "hot spots", where stress concentration formerly caused fatigue cracks. The streamlined root provides a smooth pattern of stress distribution.

The reliability of this research-inspired thread root is achieved directly on the production line. SPS makes and maintains its own thread roll dies. Skilled machine operators check die performance as often as every 50 pieces.

Gauges at production stations are calibrated daily against standards set by the SPS Metrology system . . . industry's most advanced thread control facility.

UNBRAKO socket screws . . . the advanced fastener for the '60's . . . are but one outstanding example of the tireless SPS effort to create reliability through research. Born in the laboratory . . . formed to strict production quality standards . . . these improved fasteners are now in use throughout industry.

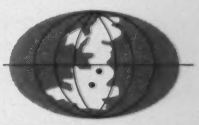
This is SPS reliability at work for you. Write for a 20-page booklet called, "The Root of the Thread", which presents a comprehensive description of this development.

UNITED STATES

CANADA

SPS

where reliability replaces probability



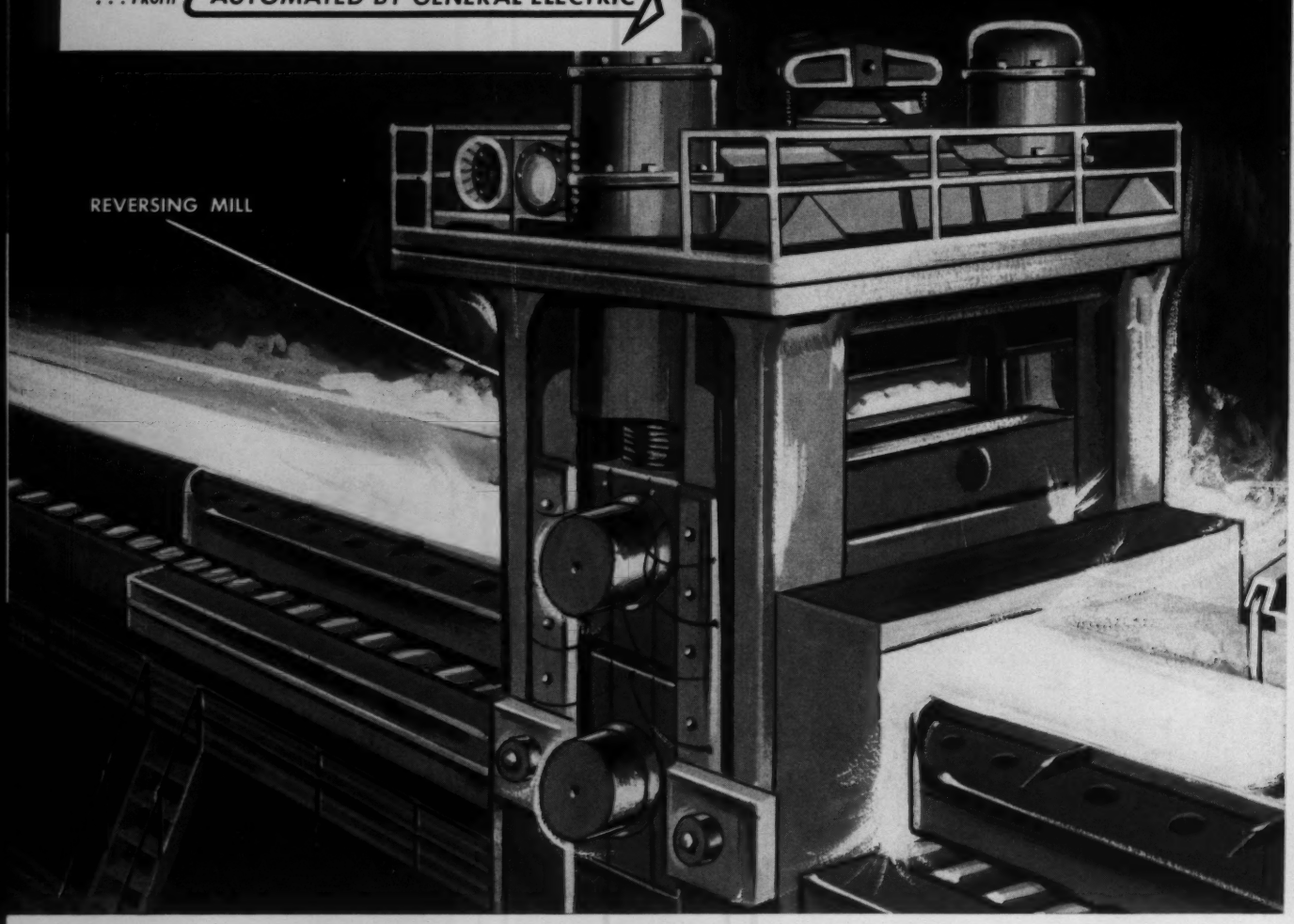
GREAT BRITAIN

EUROPE

STANDARD PRESSED STEEL COMPANY, Jenkintown, Pa. • SPS Western, Santa Ana, Calif. • The Cleveland Cap Screw Company, Cleveland, O. • Columbia Steel Equipment Div., Fort Washington, Pa. • International Electronic Industries, Inc., Nashville, Tenn. • National Machine Products Div., Utica, Mich. • Standco Canada, Ltd., Toronto, Canada • Unbrako Socket Screw Co., Limited, Coventry and Sheffield, England • Unbrako Schrauben GmbH, Dusseldorf and Koblenz, W. Germany.

FOR QUALITY... PRODUCTIVITY ... PROFIT

METAL ROLLING
AUTOMATED BY GENERAL ELECTRIC



A NEW CONTROL FOR REVERSING HOT MILLS

G-E program-control system operates

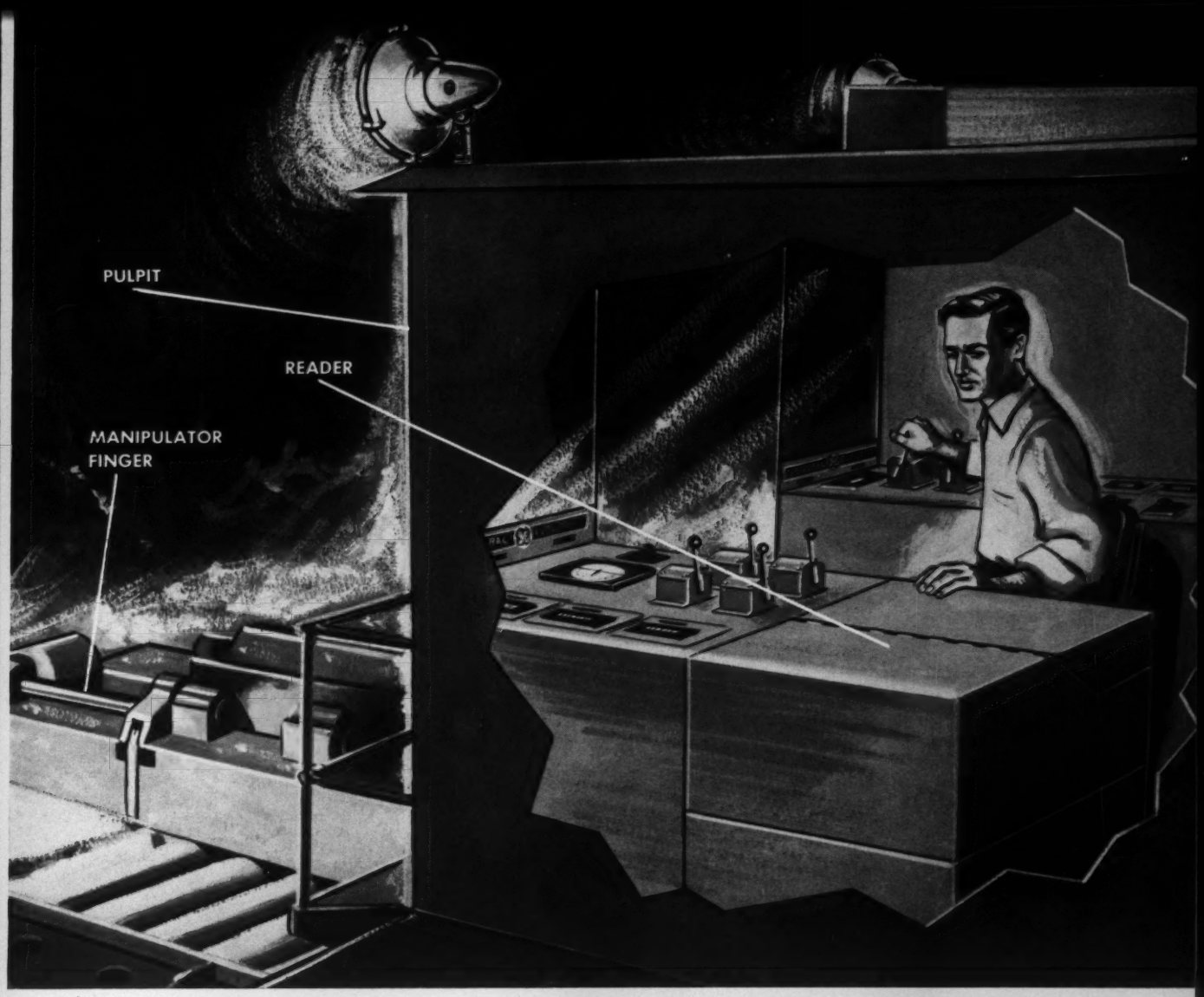
General Electric's new program control for reversing hot mills performs an entire rolling cycle—automatically. Increased yield per ingot, substantially improved product quality and reduced unit cost are outstanding advantages of this new control system.

HOW G-E PROGRAM CONTROL OPERATES

The entire rolling operation, from ingot entry to finished slab, is controlled automatically. A punched card or other memory device is used for data storage and to control the entire operating sequence.

The cards are punched to perform mill functions previously determined to be the most efficient for the equipment involved and the product desired. This controlling element is read by an industrial card reader, which sends impulses to the control circuit and on to the screwdown motors, mill table drives, and manipulator drives. The operator, seated in the pulpit, inserts the card into the reader, depresses a pushbutton, and then the control directs the entire operating sequence. The speed of the mill table, position of the rolls, manipulation of the piece, and sequencing operations for all passes are controlled automatically by the program control system.

Yield is increased—The General Electric program control schedules the mill tables to run at the most desirable and efficient speed. It also brings the rolls into the position calculated for maximum ingot reduction on each pass and turns the ingot at the exact time determined to produce highest slab quality. This precision control produces more finished slabs per turn than manually controlled mills.



entire rolling cycle — automatically

Quality is improved—Greater slab uniformity is obtained with G-E automatic program control. Consistent roll settings and mill speeds produce uniform slabs. This improved quality control also results in substantially less scrap.

Unit cost is reduced—Automatic programming produces finished slabs faster than ever before possible. Higher operating efficiency of machinery and faster equipment adjustment by automatic control cut production time—therein reducing unit cost.

Get all the facts on this new automatic control for steel mills. Contact your G-E Apparatus Sales Engineer today, or write to Sect. 785–10, General Electric Company, Schenectady 5, N. Y., for bulletin GEA-6869. Industry Control Department, Salem, Virginia.

Progress Is Our Most Important Product

GENERAL ELECTRIC

NATIONAL ACME'S
"ZONE OF RESPONSIBILITY"
INCLUDES ALL PHASES
OF COST REDUCTION

Check YOURS...Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Minneapolis Honeywell . . . an "every day" job for Acme-Gridleys.

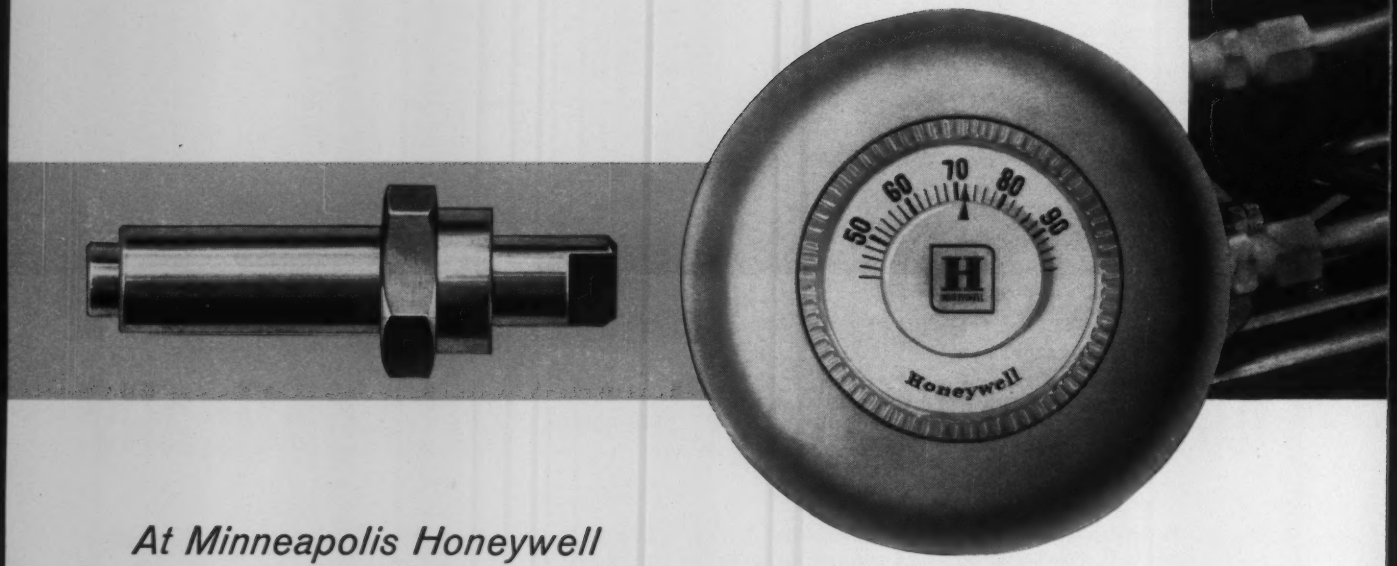
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

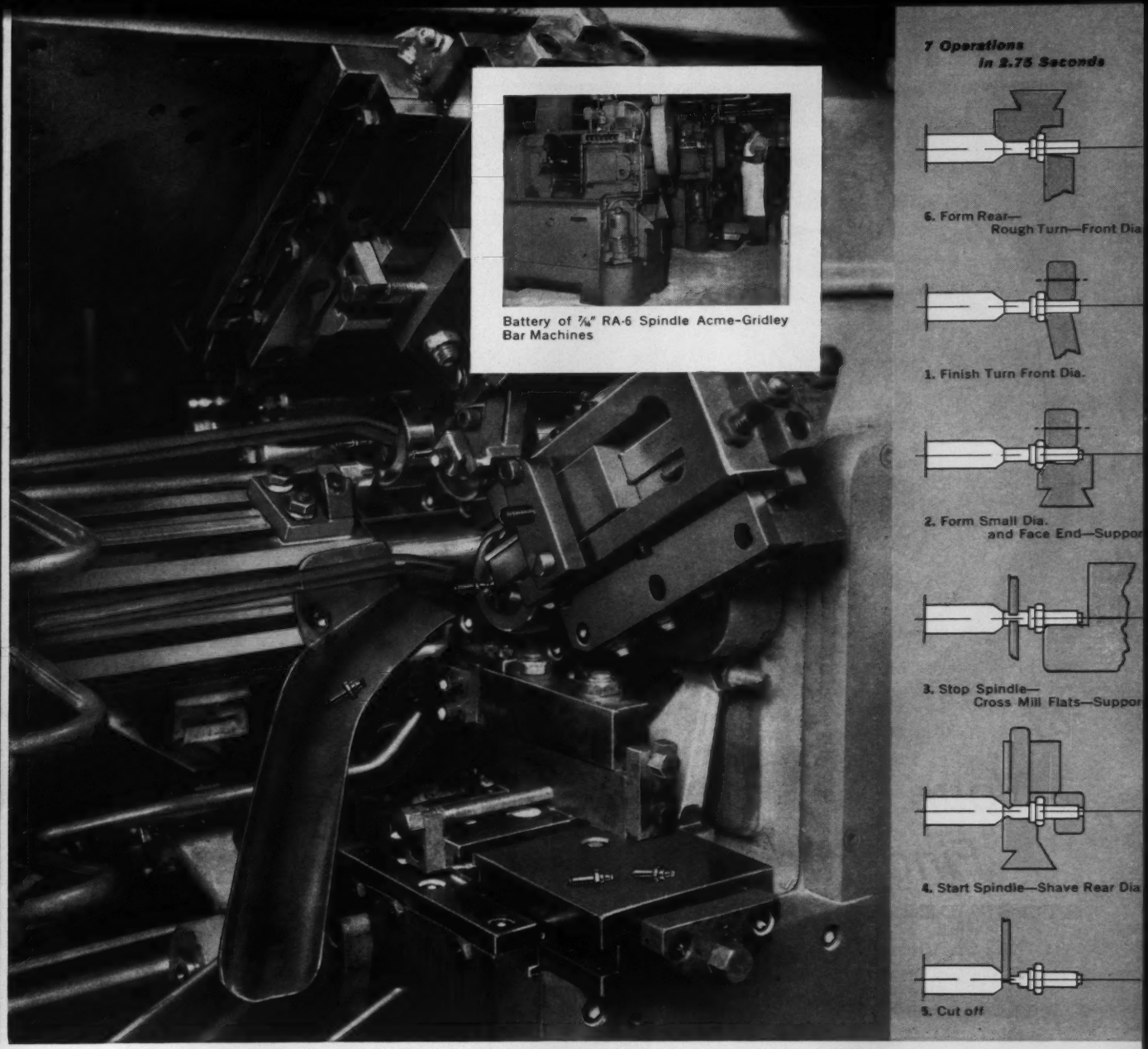
Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



At Minneapolis Honeywell

ONE ACME-GRIDLEY REPLACES FIVE SINGLE SPINDLE MACHINES

. . . Saves 80% in Machine Hours



Battery of ⅞" RA-6 Spindle Acme-Gridley Bar Machines

Close up of tooling zone showing 3rd, 4th and 5th position operations

. . . *in addition* the reject rate is reduced 83% and operator hours per thousand slashed 92% in the production of a precision center post component for residential thermostats. What's more, with one machine, one set of tools, and one operator doing all machining in the primary setup, quality control is greatly simplified, and valuable floor space saved. Still further savings result from greatly reduced machine maintenance.

Such drastic savings are possible for Minneapolis Honeywell because of inherent Acme-Gridley features such as independently operated tool slides, the extreme accuracy and flexibility of direct camming, and wide open tooling zones. Rugged and versatile 7/16" Acme-Gridleys fit right in with Honeywell's program of "Total Machine Utilization"; will pay off for years to come by economically accommodating the materials and setups Honeywell requires in the production of small, high quality parts for their precision instruments.

Get the complete story on how Acme-Gridley Automatics provide industry's most modern approach to cost reduction. Call, write or wire.

Pioneer in Circumferential Automation

National Acme

The National Acme Company
175 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N. J.; Chicago 6, Ill.; Detroit 27, Mich.

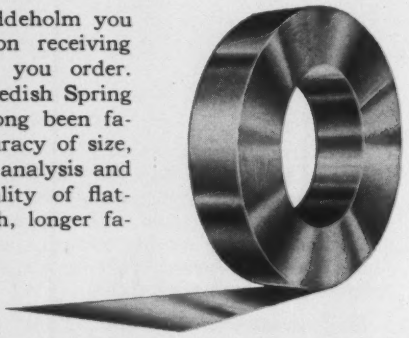
At Your Fingertip . . . UDDEHOLM Spring Steels

STOCK DELIVERY—WIDEST SELECTION—ULTIMATE QUALITY

There are large stocks of almost every grade, analysis and size in every Uddeholm Steel Service Center . . . New York, Cleveland and Los Angeles. You can obtain rapid delivery of tempered, annealed, polished, blue, scaleless or stainless spring steels in widths, thicknesses, lengths and edges to fit your needs exactly. Thicknesses range from .001" to .125", widths from $\frac{1}{8}$" to $16\frac{1}{4}$" with square or rounded edges.

Uddeholm Specialty Steel Service Centers offer a wide range of analyses—straight carbon steels such as SAE 1075 and SAE 1095—Alloy Spring Steels with nickel, chromium, etc., and Stainless Spring Steels for special applications.

And, with Uddeholm you can depend on receiving exactly what you order. Uddeholm Swedish Spring Steels have long been famous for accuracy of size, uniformity of analysis and hardness, quality of flatness and finish, longer fatigue life.



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UHB
TOOL AND DIE STEELS
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UDDEHOLM COMPANY OF AMERICA, INC.

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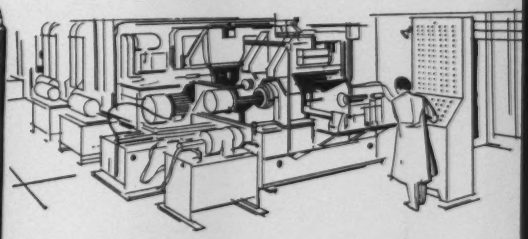
AUTOMATION BEGINS HERE

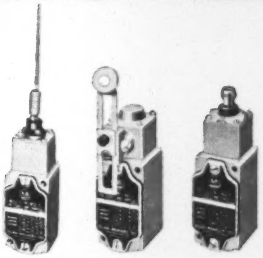
. . . Insist on Allen-Bradley accessories for continuous automatic production



In this broad line of Allen-Bradley accessories, each and every unit carries the traditional A-B trademark of *quality* that stands for trouble free operation. Rugged construction, and maintenance free, silver alloy contacts provide the reliability that is essential to the continuous operation of *your* automatic production machines.

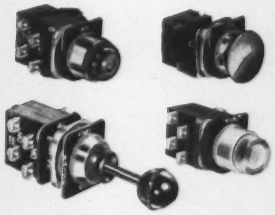
Profit from the experience of the leading machine tool builders . . . insist on Allen-Bradley *quality* motor control *all the way!*

▲ Special push button panels can be assembled to your specifications.

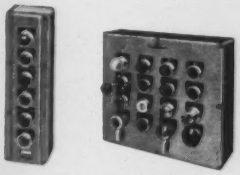


OILTIGHT LIMIT SWITCHES
Bulletin 802T with sealed heads and bodies. Various operators.

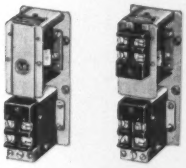
PRECISION LIMIT SWITCH
Bulletin 802 oiltight. Responds to very small operator travel.



OILTIGHT CONTROL UNITS
Bulletin 800T. Choice of push buttons, lights, and switches.



OILTIGHT CONTROL STATIONS
Bulletin 800T for up to 16 units in die cast aluminum enclosure.



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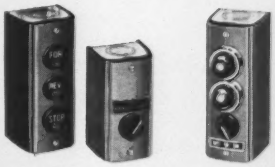
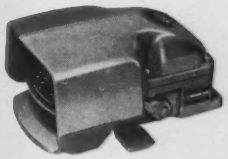
Bulletin 836. For hydraulic systems with pressures to 5000 psi.



STANDARD DUTY PUSH BUTTONS
Bulletin 800. Up to three units, also pilot lights and switches.



FOOT SWITCH
Bulletin 805. In rugged die cast housing for toughest service.

2-60-R

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NEW Bulletin 700, Type B-220A, AC Control Relay with 2 N.O. and 2 N.C. contacts.

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NEW ALLEN-BRADLEY BULLETIN 700 RELAYS

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These new Allen-Bradley Bulletin 700 Type B and Type BX relays offer even greater value and greater reliability than ever before—but the price has not been changed.

- **New mechanical design gives at least 5 times greater operating life.**
- **New contact motion provides 10 times greater electrical reliability.**
- **Complete interchangeability—mounting dimensions are unchanged.**
- **New hermetically sealed plastic coil fits Bulletin 700 relays presently in use.**
- **New, stronger, movable contact crossbar—also fits old relays.**
- **New reinforced stationary contact blocks—interchangeable with previous design.**

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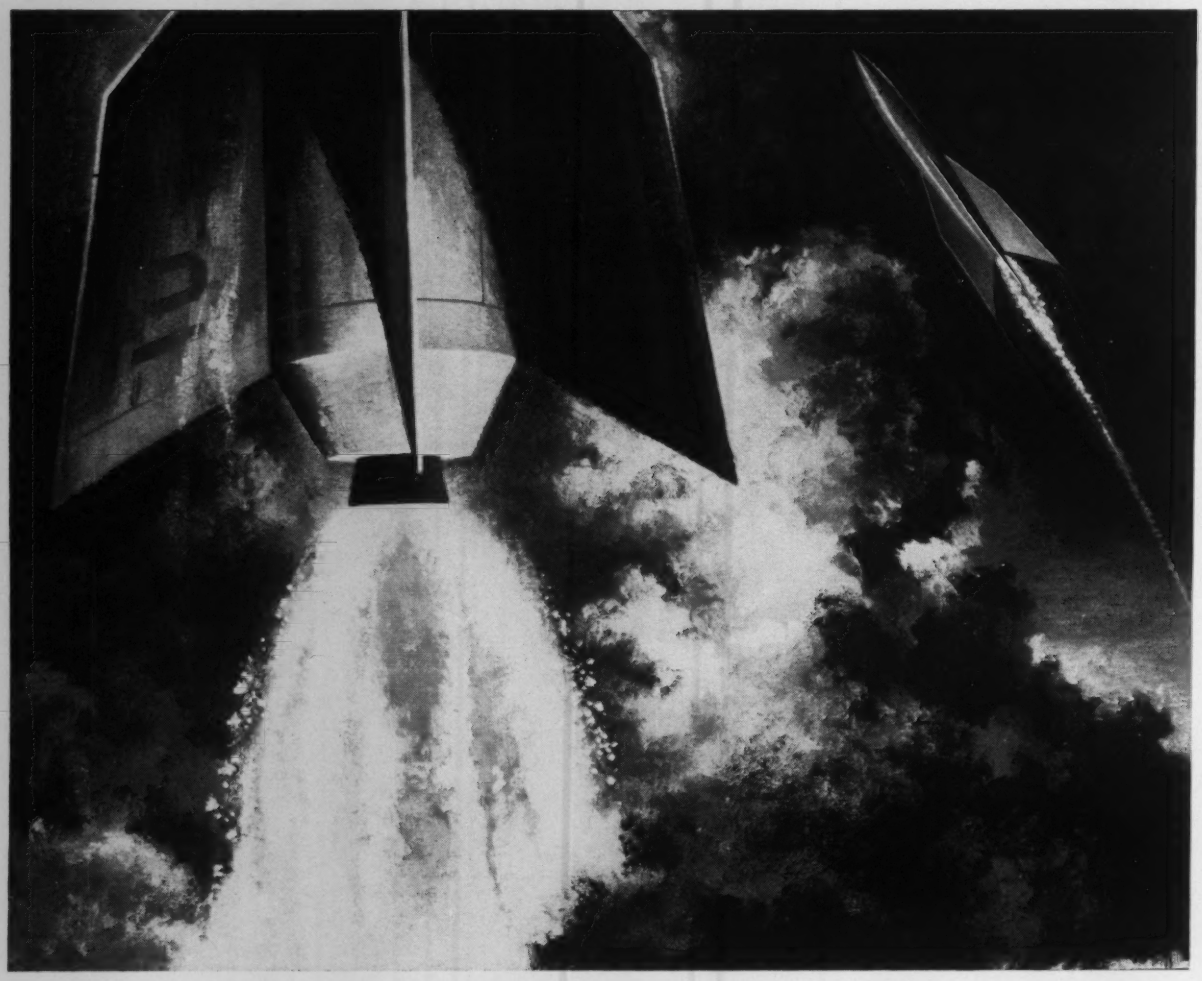
McLOUTH STAINLESS STEEL



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Sylvania's latest achievement is the production of refractory metal ingots large enough for direct fabrication into missile and rocket parts. These ingots contain 100% tungsten or molybdenum . . . or they can be supplied as a solid solution alloy of these two elements in many combinations.

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Sylvania produces highest purity powders and pellets of tungsten and molybdenum and their alloys. Their uniform high quality is the industry standard.

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Sylvania's new large-size capabilities offer substantial operating economies for arc-casters. *Electrodes now can be produced in sizes up to 10″ diameter and 4 ft. long.*

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For complete information on these Sylvania refractory metals, write to Sylvania Chemical and Metallurgical Division.

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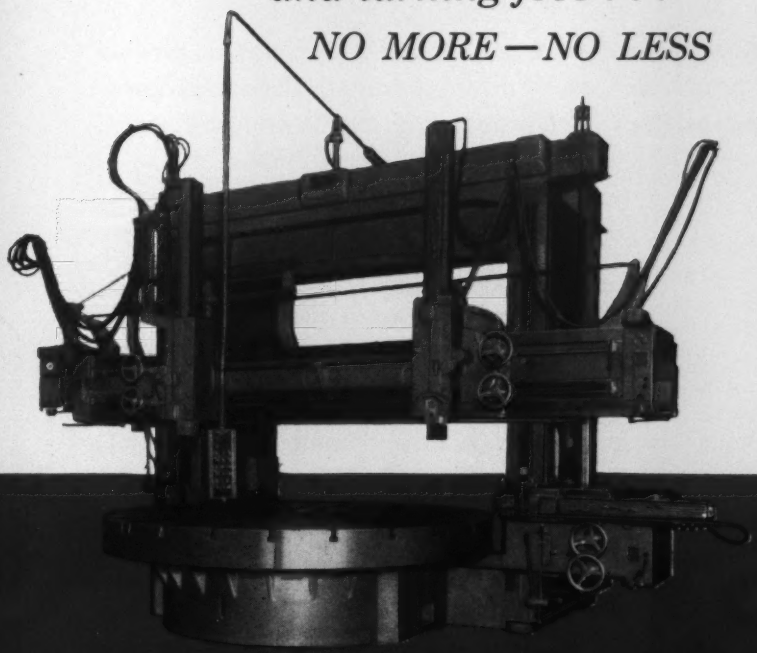

When you get into the large-job operations requiring a vertical mill with table size 6 feet and over, your equipment needs are very often more specialized. And that's where these big KING® Vertical Boring and Turning Machines *really help your profit picture!*

Maybe you do need *complete* pendant (or cabinet) pushbutton control of speed and feed selection and changes, of power indexing of turrets and directional movement of heads, in addition to standard actuating controls. *You can get all of this in a KING*—plus tracer control and automatic feed stops, increased height under rail, and increased ram capacity—if needed. But suppose you can profitably use only pushbutton control of speed changes and turret indexing—or maybe only the basic actuating pendant controls. You can get exactly that equipment, too. In fact—

KING can provide a machine with complete or any degree of pushbutton controls or optional features and design modifications, depending on your actual needs. Your KING is "tailored" to meet your exact requirements . . . you buy as much or as little special construction and added equipment as you want—no more, no less!

Match Your Need Exactly from the Complete Line of Kings

KING VERTICAL BORING AND TURNING MACHINES

For smaller jobs:
Standard machines, in sizes 30", 36", 42", and 52", with basic actuating pushbutton controls on pendant for rail positioning, rapid traverse, and main drive.

For larger jobs:
Standard machines, in sizes 63", 72", 84", 100", 120", 144", and up, with basic actuating pushbutton controls as above.

Custom-built machines, in sizes 62" to 124" and up, with basic actuating pushbutton controls plus one or more of the following special features: pushbutton control of power indexing of turrets, of feed and speed selection and change, of directional movement of heads; tracer control; automatic feed stops; increased height under rail; increased ram capacity; coolant arrangement through rams.

NEW-DESIGN KING MACHINES, WITH FULL ELECTRICAL CONTROL

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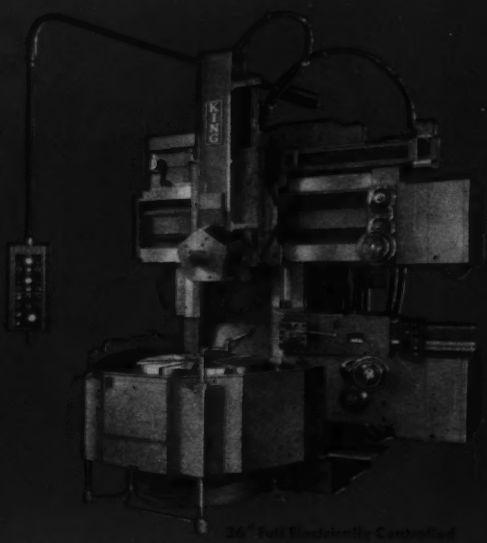
All sizes with Full Electrical Control. Optional added features: automatic cycling, tracer control, power indexing of turrets, automatic feed stops.



36" Full Electrically Controlled King with automatic feed stops on turret head.

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FORMULA FOR MMT=PE TOMORROW

KING Vertical Boring and Turning Machines

CF&I WIRE HELPS PACKAGED for YOUR PRODUCTION

"CF&I Stem-paks cut machine loading time 80%... give us an extra hour of production every day," stated Mr. Frederick Voos, Plant Superintendent, Risdon Manufacturing Co., Waterbury, Conn.

PROBLEM

1. "Our specially designed machines *were* fed wire from coils averaging 150 lbs. Because of the small size, frequent machine loadings were necessary. Each time, the coils had to be loaded by hand and the bindings clipped, after which the wire was guided through the straighteners before entering the machine. We were losing valuable production time due to excessive machine downtime," explained Mr. Voos.

SOLUTION

1. "Our Purchasing Department called a CF&I salesman who carefully examined our operation and recommended that we switch to CF&I Stem-paks which hold up to 1,000 lbs. of one continuous length of wire. Each Stem-pak feeds a machine for an average of one to two days... a production time equal to using seven coils with set-ups in the past.

"Stem-paks give us approximately an extra hour of production per day on each machine," Mr. Voos pointed out. "A Stem-pak can be set up in one-fifth of the time required for the seven coils of wire formerly used... *a saving of 80% on loading time.* The extra hour of production represents a 12½% increase in the operator's production time."

CF&I Stem-paks are delivered on pallets for fast unloading and easy in-plant handling by fork trucks.

PROBLEM

2. "Part of our operation required the use of wire that was free from rust, grease or dirt. Too often, unprotected coils would collect dirt in transit or storage.

SOLUTION

2. "CF&I Fibre Drums are an ideal answer to the problem of unclean wire. The sturdy Fibre Drum has a metal cover and locking band which seals the drum, protecting the wire from grime and from corrosive elements. In addition, Fibre Drums hold up to 600 lbs. of one continuous length of wire which enables us to run our machines for a longer time than when we used small coils."

Stem-paks and Fibre Drums are just two of nine wire packages that CF&I offers to help make your operation more efficient and economical. When you order from

INCREASE PRODUCTION 12½%

at Risdon Manufacturing Co., Waterbury, Conn.

Risdon Mfg. Co. also uses CF&I Fibre Drums, which hold up to 600 lbs. of wire, for special operations. The sealed Fibre Drums protect the wire against rust and contamination during transit and in-plant storage. Note how closely the Fibre Drums can be placed to the machine and how evenly the wire pays off.

A Stem-pak is easily placed in storage alongside Fibre Drums. No messy storage problems... no chance of coils becoming tangled. Inventory of this neat, compact storage set-up is a quick, simple counting job.

CF&I, you can specify wire *packaged for your production* to give you one or more of these benefits:

- **less downtime through extra-long continuous lengths of wire**
- **compact storage and simplified inventory control**
- **fast unloading and in-plant handling**
- **assured cleanliness of the wire**
- **smooth pay off of the wire**

A CF&I salesman will be glad to assist in selecting the *right* wire package for your operation. There's no charge for this service, so call our nearest sales office today.

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Ferromanganese-silicon allows savings of as much as $8 per ton, depending upon practice, in the production of high-manganese stainless steels. It also reduces manganese costs for the chromium-nickel grades of stainless.

The alloy is both an efficient slag reducing agent and the lowest-priced source of low-carbon manganese currently available. For details on cost reductions in your practice, contact your UNION CARBIDE METALS representative.

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

Ferromanganese-silicon gives lower costs, rapid solubility, and high manganese recoveries.

UNION CARBIDE METALS

Electromet *Brand Ferroalloys and other Metallurgical Products*

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

ACTION TO IMPROVE U. S. EXPORT TRADE is coming from the government. The Dept. of Commerce is calling manufacturers to a series of trade meetings in Washington next month. Purpose: Generating new ideas about rebuilding U. S. export markets. Executives from metalworking industries will take part.

STEEL SHIPMENTS BY GEOGRAPHICAL DESTINATION are expected to be issued by the American Iron and Steel Institute. This valuable market aid will be published later this year on a quarterly basis.

TREND TO ALUMINUM ENGINES in compact cars has not been slowed. Auto industry sources say that at least three more compact cars powered by aluminum engines will be out this fall. Now, Chevrolet's Corvair is the only U. S.-made compact with the aluminum engine. Rumors that plans for more aluminum engines had been sidetracked are denied by people in authority.

USERS OF HEAVY ELECTRICAL EQUIPMENT may face a supply pinch if they don't start ordering heavy apparatus soon. Utilities have been dragging their heels on orders and time is running out for 1961 delivery. Apparatus men see another rush coming when the utilities try to make up for lost time.

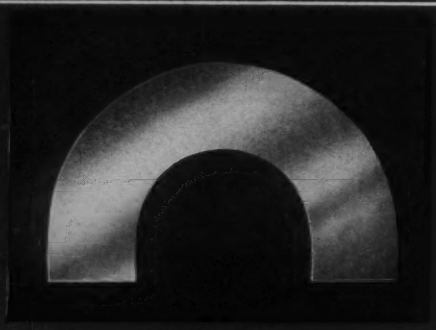
STEEL MILL OXYGEN USE, now estimated at about 500 cu ft per ingot ton, may be only in its infancy. Last year's strike slowed work on several major oxygen plants for steel mills and blast furnace use looks bigger and bigger. Other oxygen use in metals has possibilities, but so far is more or less limited to the exotic metals.

REGIONAL MARKET NOTE FROM CLEVELAND: The city's industrial area last year showed the greatest gains since 1956. A total of 75 new manufacturing plants were established and 627 companies spent $132 million on expansions. The 75 new plants added total annual payrolls of $4,250,000, according to the Cleveland Chamber of Commerce.

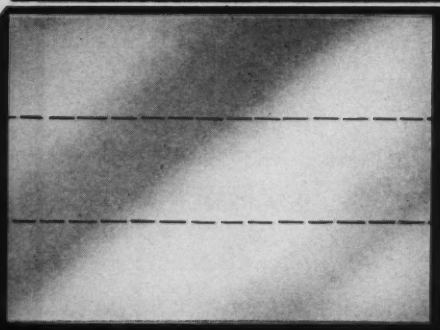
A COMPACT-COMPACT CAR may be produced by Ford in 1962. It will be Volkswagen-size, with a V-4 engine. But as usual, other automakers won't be far behind, if at all, if and when the decision is made. Both GM and Chrysler have similar models under study.

*$100.00 per part production SAVINGS.... ...with the BATH METHOD

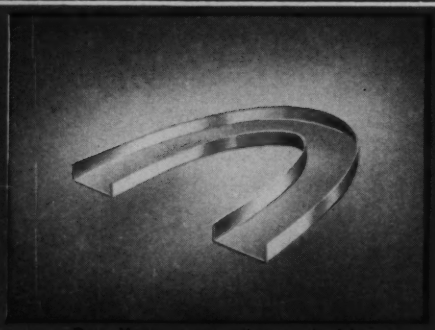
OLD METHOD



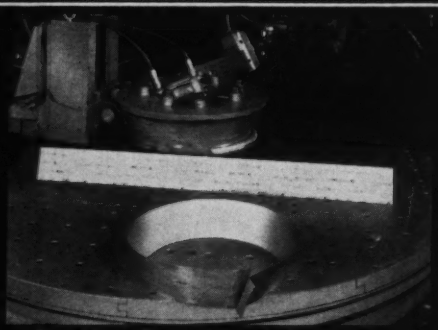
Cutting out the blank in this titanium piece was [illegible]



3 titanium parts per piece instead of one.



Drop Hammer operation resulted in heavy scrap loss.



Radial Draw Forming prior to Drop Hammer operation eliminated metal distortion, greatly reduced rejects.

Finished part

Finished part

*The illustrated titanium part was not only expensive to make by old methods, but because of metal distortion, the part reject loss was tremendous. By STRETCH RELIEVING the titanium, using a Bath Radial Draw Former, part rejects were practically eliminated . . . in short, a method of forming shapes that keep their shape . . . even after heat treating . . . *Send for the plant facilities folder, it illustrates both the standard Radial Draw Forming facilities, plus a completely new series of HIGH SPEED production forming machines.*

THE CYRIL BATH COMPANY

32340 AURORA [illegible] • SOLON, OHIO
(LOCATED IN THE GREATER CLEVELAND AREA)
Manufacturers of Radial Draw Formers • Dies • Tools
Press Brakes • Tangent Bending Sequence Presses • Press
Type Brakes • Special Machines

How Technology Widens Scope Of Minor Metals

High cost of many minor metals has prevented their general use in metalworking.

But technical breakthroughs and space age demands create new markets.—By F. J. Starin.

■ Makers and fabricators of minor metals are scrambling to meet a demand they didn't foresee, and couldn't have foreseen, just a few years ago.

Some new markets require such improved performance and reliability that material costs have become secondary. Minor metals makers have launched research and development projects aimed at widening their lines of shapes and sizes to meet space age markets.

Now, technological advances are opening up still more possibilities. The leaders in this industry say that the ultimate potential can't be charted yet.

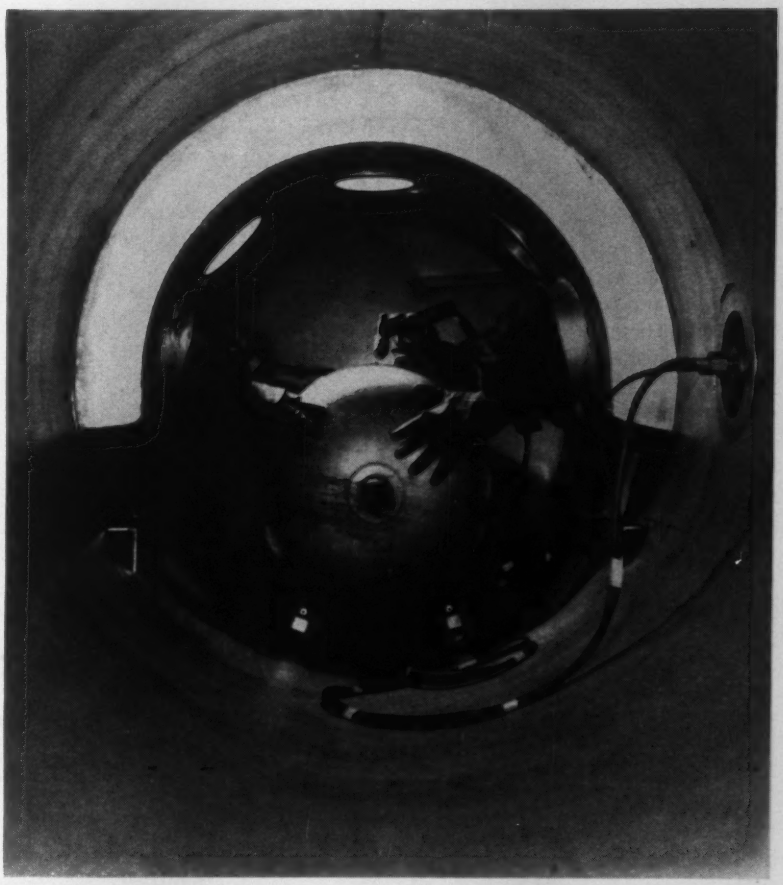
Headed for Space—Tungsten is an example. Sylvania Electric Co. started working with the metal for their earliest light bulbs. Fansteel Metallurgical Co. started putting small quantities in auto contact points about 1915.

But during the last few years, tungsten's 6125°F melting point and its ability to keep its strength at high temperatures attracted interest from several space-age projects.

Sylvania developed a unique isostatic pressing and sintering operation to meet the demand for larger, better quality billets. And Fansteel launched what its president, Frank H. Driggs, calls "a full scale lab assault" on the metal.

Market Explosion — Dr. Driggs points out that techniques for working tungsten in quantity just started to evolve in the last few years. The latest market figures from the Bureau of Mines show that consumption of tungsten in the first three quarters of 1959 easily topped all of 1958. And it was 139 pct more than the same period in 1958.

This page out of the tungsten story can be matched by many of the minor metals. They've been known for years. But problems, in recovery and fabrication mostly, have kept prices too high to attract much interest.



TECHNIQUE: Union Carbide devised a method of welding tantalum without contamination, with Heliarc inside a vacuum purge dry-box.

Cost Is Relative—Now, the new demands of performance and reliability have made cost a relative factor. Almost any improvement in these areas is worth the price.

This has prompted many companies to start pushing research and market development on some of these long-dormant, or at least

lethargic, items. Overnight success stories have become almost common.

Tellurium Moves Ahead—It was discovered tellurium is almost indispensable in any attempt to generate thermoelectricity. Now, trade and government sources say potential users are starting to stockpile the metal—at $2.50 per lb. Shipments in 1959 more than doubled 1958. And imports almost tripled.

Sylvania has branched into germanium, among other minor metals. A spokesman says, "Don't even ask me about it. We have all we can do to meet demand, much less develop new markets."

Wolverine Tube Div., Calumet & Hecla Inc., makes tubing of zirconium, tantalum, titanium, vanadium, molybdenum and columbium. It has been planning for some time now to branch out into other shapes. But demand for tubing alone has grown to the extent that spokesman says the company hasn't the time, manpower or capacity to fill it.

Extrusion Improvement—One of C&H's latest advances has been an improvement in its extrusion that makes possible seamless tubing in lengths to 60 ft. This metal, one of the most corrosive resistant, in great demand by the chemical processing industry.

Shortly before this, the Kawecki Chemical Co., Boyerstown, Pa., announced the commercial production of tantalum sheet in larger sizes than previously available. Sheets 36 in. wide, by 72 in. long can now be rolled. The price is the same as for the narrower (24 in.) sheet.

Prices Come Down—This continues the downward trend of tantalum prices as producers and fabricators find both increases in demand and technology permit economy in production. Late last month, Fansteel, which has been working with tantalum since 1922, lowered the primary price from $35 per lb to $30. And only in June, 1959, Union Carbide Metals Co. had dropped the price from $60 to $35.

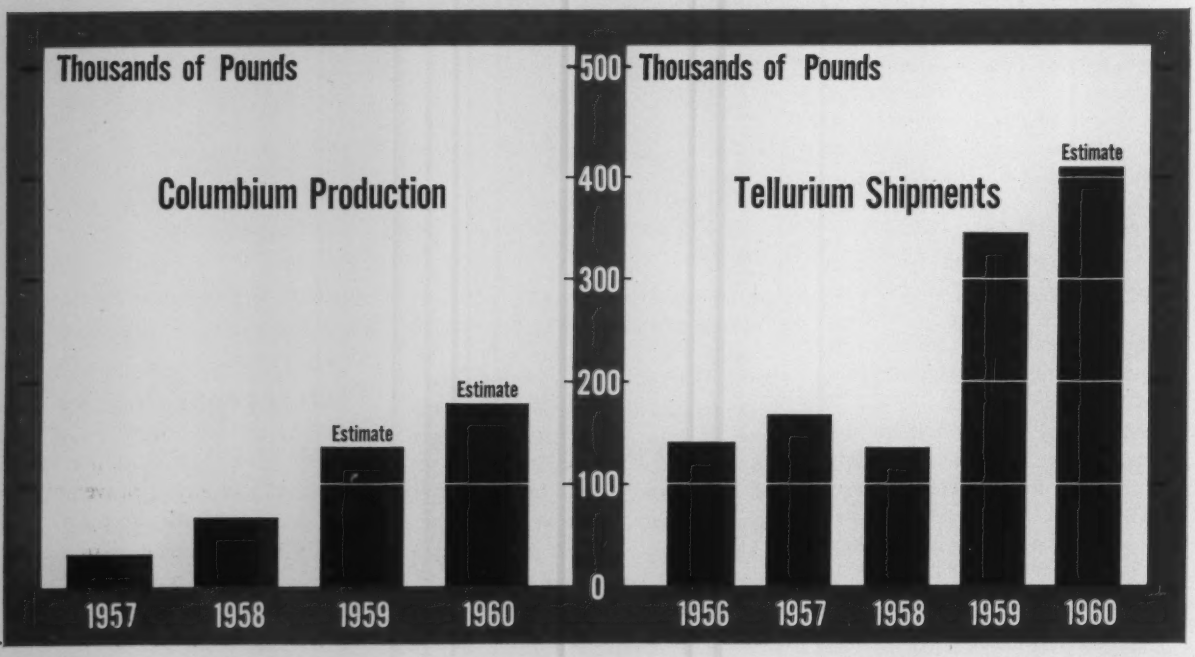
The Business and Defense Services Adm., Dept. of Commerce, figures tantalum output in 1959 topped 1958 by about 25 pct. This was more than most predictions had indicated. This increase was shared by all tantalum markets—military uses, capacitors, atomic energy applications, as well as chemical industry—and will likely be repeated this year.

Columbium Too — Columbium, usually considered along with tantalum because both come from the same ore, had an even more spectacular increase in 1959. It more than doubled 1958 production, which itself had about doubled 1957.

BDSA says, "Total (columbium) output, although representing an appreciable increase, was still small and for the most part limited to use in atomic energy applications. Interest, however, in both the pure metal and alloys, continues to be strong. . . . Efforts are directed mainly toward developing a good structural material. . . . It is likely new uses will be developed in 1960."

Sheet Rolling—Union Carbide has had one of the most dramatic projects with columbium. In the fall of 1958, Universal-Cyclops Steel Corp. cast the largest ingot

Typical Growth Patterns of Some Minor Metals



to that date—325 lb. Then, the two companies joined in a development effort which succeeded in rolling the largest sheet of pure columbium to date—36 in. by 95 in., gage 0.028 in., as well as thin gage strips, coils, and other sheet.

Union Carbide has also developed a columbium base alloy—Cb-65 with tensile strength of 37,000 psi at 1800°F. And the company says its work indicates it will soon be able to push this up to 40,000 psi tensile strength at 2200°F.

Market Changes—Right now, the overall minor metals picture is far from clear, despite the obvious dramatic advances. For one thing, markets are in a constant state of flux. The tellurium price, for example, has actually been moving upward. Several government observers fear that shipment statistics don't reflect true consumption. They say that unless the potential thermoelectric market comes in soon and is as big as expected, the market is liable to tumble.

Also, many of the pioneer applications, for which the breakthroughs are being made, are on government contracts, and strictly classified. Wyman - Gordon Co., Worcester, Mass., has been doing some interesting work in its specialty, forgings. In minor metals it has been working with tungsten, columbium, molybdenum, chromium and vanadium. Talk concerns advances in such areas as elimination of surface contamination in forging columbium, partial success in open die forging of vanadium and chromium, and advances in forging large tungsten-molybdenum alloys. But almost nothing is said about the original work done on missile and rocket parts.

Competitive Secrets—And some advances are currently regarded as business secrets. A Calumet & Hecla spokesman says his company has several very successful projects, big in dollar volume. But even the metals worked are closely guarded company secrets for competitive reasons.

PROGRESS: Dr. Arthur B. Michael (l.), director of research of the Fansteel Metallurgical Co., a leading producer of several minor metals, discusses new markets with company president Dr. Frank H. Driggs.

Also, many of the minor metals are by-products of major metals. These are available only in proportion to market conditions of the major metal. Kennecott Copper Co. and its fabricating subsidiary, Chase Brass and Copper Co., have done some work with rhenium. This metal is very dense, and has a melting point topped only by tungsten and carbon.

Rhenium Potential—It is a by-product of Kennecott's copper mining. Kennecott's research and development labs developed superior recovery and purification methods, and Chase worked on production of powder and wrought metal.

The two see excellent possibilities for welding molybdenum, electrical contacts, gages, and measurement devices. They also see potential for bringing the price down. But now bars cost $680 per lb, wire $780 per lb, and foil $2125 per lb.

Another problem: No one is quite sure what the future markets will look like. Minor metals are competing with each other, as well as some of the major metals.

Zirconium Potential — Calumet & Hecla works zirconium and zirconium alloys, titanium, for which a better volume is expected, and tantalum, which has a good outlook because of its corrosion resistance. Also worked are columbium, vanadium and molybdenum "occasionally." A spokesman said the company hopes "someday someone will want them."

Union Carbide, on the other hand, has called vanadium the "metal with a future" and paid close attention to its development.

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Aluminum Ponders FTC Ruling

Decision May Stop Acquisition of Fabricators

Arrow Brands case, against Reynolds Metals may set a precedent.

Reynolds will take the ruling to court, denies harm to the industry.—By R. D. Raddant.

■ Is the Government calling a halt to basic aluminum producers' penetration into fabricating and marketing of end products?

This question was raised last week by the Federal Trade Commission's ruling against Reynolds Metals Co. The FTC ordered Reynolds to sell Arrow Brands, Inc., a former customer in the florist foil field, acquired in 1956.

Will Contest—Reynolds promptly said it would contest the decision, and refused to acknowledge that it would likely stand. But the ruling was felt by aluminum producers who have acquired, or are planning to acquire, fabricators or other market outlets.

The trend of aluminum producers to get closer to and develop their final markets has been apparent. (See IRON AGE, Feb. 11, P. 108). Now, the producers are concerned about more government.

FTC Position—A spokesman for the FTC told The IRON AGE that the Arrow Brands decision was not necessarily a precedent-type action. He said the decision was based on the individual case alone.

But the fact is people in the aluminum industry think the Arrow Brands case is a portent of things to come. Privately, they say they will not be surprised if there is more government action soon.

Merger Muddle—One aluminum company official says his company does not feel there are grounds for anti-trust action, but believes the Justice Dept. or the FTC will continue to probe.

But, at the same time, the possibility is not deterring the company from future acquisitions. "The whole merger field is so muddled, you can't get a clear-cut answer in advance."

New Plant Too — In the Arrow Brands decision, the FTC not only ordered Reynolds to sell all properties obtained through the acquisition, but also a $500,000 plant built for Arrow. (See box). The company must restore Arrow's pre-acquisition standing in its field.

Gustav B. Margraf, Reynolds vice president, denies the acquisition has lessened competition, contends it actually increased it. If the decision is allowed to stand, he said, "No company acquiring a smaller one in similar circumstances can spend more money than any other of its competitors either to improve products for the benefit of the public, or advertise them, or lower prices to protect itself against either foreign or domestic competition."

Hot Metal—The FTC decision also revives interest in the hot metal contracts (sale of molten aluminum) of the aluminum industry. Secondary smelters contend that these contracts amount to discounting.

How Reynolds Reacts

Following the FTC decision, The IRON AGE asked Reynolds Metals Co. this question:

"Do you believe the FTC action means that aluminum producers will be blocked from future acquisitions of fabricating companies similar to Arrow?"

A company spokesman replied:

"We don't acknowledge that the FTC decision will stand, but if it does, it would, as pointed out in Mr. Margraf's statement, have an unfortunate effect of blocking types of acquisitions which are beneficial to the public.

"Where one company acquires another and creates new products and improves old products, and where competition truly continues to exist as much as before or even in greater degree, no harm is done and, in fact, the public is benefitted.

"Reynolds contends this is what happened in the case of Arrow Brands.

"The volume of business affected by the FTC decision is very small in relation to Reynolds' total business. Our primary reason for buying Arrow Brands was not to get into the rather tiny florist foil business, but to acquire the creative abilities of Harry Roth (Arrow owner and president) and his personnel, a group of 'idea men" who had ideas for new and better products in the gift wrap field.

"The result was introduction by Reynolds Metals Co., not by Arrow Brands, of a new and unique 'Designs for Giving' line of gift wrap. . . .

"The $500,000 plant we built in California was not built for the florist foil business—which could be handled with a few thousand dollars worth of equipment—but for production of the gift wrap line marketed by Reynolds' decorative foil division."

REVERSING THE TREND: Government trade experts want to see more ships leaving U. S. ports, fewer coming in.

U.S. Moves to Increase Exports

Concerned about the growing gap between exports and imports, government trade experts are taking action.

First step: Meetings with manufacturers on ways to boost exports.—By G. H. Baker.

▪ The government is moving to improve U. S. export trade.

Trade experts are concerned about the constant or declining rate of exports, while imports keep increasing. Total imports have exceeded total exports for many months by a big gap—and the gap is widening. The result: A constantly-increasing deficit in the U. S. balance of payments.

Three Plans—The experts say the U. S. must (1) Start trimming giveaway programs, (2) Help U. S. manufacturers sell more goods abroad, and (3) Take a good hard look at imports to see if quotas or higher tariffs are needed.

Aid to U. S. producers is the most likely of these choices. A pruning of the foreign-aid budget is next. Higher tariffs or quotas are not likely to come about any time soon, chiefly because Congress only last year committed the nation to another five-year period of further tariff cuts.

March Meetings—Positive action to stir up our export trade is now about to be started by the U. S. Department of Commerce.

Starting March 1, the Department is calling groups of manufacturers to a series of trade meetings in Washington. The purpose is generating some new ideas for rebuilding export trade. About 40 different meetings will be held over a period of weeks.

Top officials of the Dept.'s Bureau of Foreign Commerce will sit down with industry advisors from the 25 Business and Defense Services Administration (BDSA) divisions and top management executives in the campaign to lift U. S. export trade out of the doldrums.

Executives from steel, machinery, electrical equipment and many other industries are due to be called in for the talks.

Giveaway Doubts—There is now a growing awareness in government that the gigantic foreign-aid giveaway is overdue for a revaluation. A Senate-House Economic Committee recently was told the trade deficit will grow larger in the years immediately ahead unless there is corrective action.

Dr. B. U. Ratchford, Duke University, told the committee the Administration and the Congress are still looking at foreign aid from the point of view of the late 1940s and the early 1950s, when the non-Communist world needed assistance.

But conditions have changed. It's the United States, not its allies, that now "faces a difficult balance of payments problem," Dr. Ratchford says.

Afraid of Change—Yet, he observes, the State Dept., the Pentagon, and the foreign aid team refuse to alter the pattern of U. S. military and economic assistance. They refuse to face up to change, probably because it is always painful to make restrictive adjustments.

Steel Users Eager to Take Charge As Market Tension Eases

Post-strike recovery built adequate steel stocks sooner than expected. Result is determination to live on small inventories.

But the market is not falling apart while overall business is strong.—By Tom Campbell.

■ The steel market is not falling apart. Nor will the operating rate drop to the cellar—or even to the first floor—in the near future.

But customer pressure is off, much more and faster than many had expected. There is not the tension in the steel market that was there less than a month and a half ago.

Lead Time Shortens—This week you can get many steel items on the basis of lead time. That means the time it takes from the ingot to the final finishing operations. For most items, this means you would get shipment sometime in April if you are an ordinary customer. If you are a big wheel with plenty of business behind your request, you might get your material in late March.

Of course, the showing up of some spots on steel schedules gives rise to rumors of massive weakness in demand. There are spots. And they may come up with more regularity. Whenever a customer decides to pull his order from February or March back to April or May, that leaves a hole in steel mill schedules.

How Severe a Jolt — Holes are turning up now. But the number is not great and others move in quickly to take the space. Further, if the original hole maker actually takes his steel later, that tends to fill up later schedules.

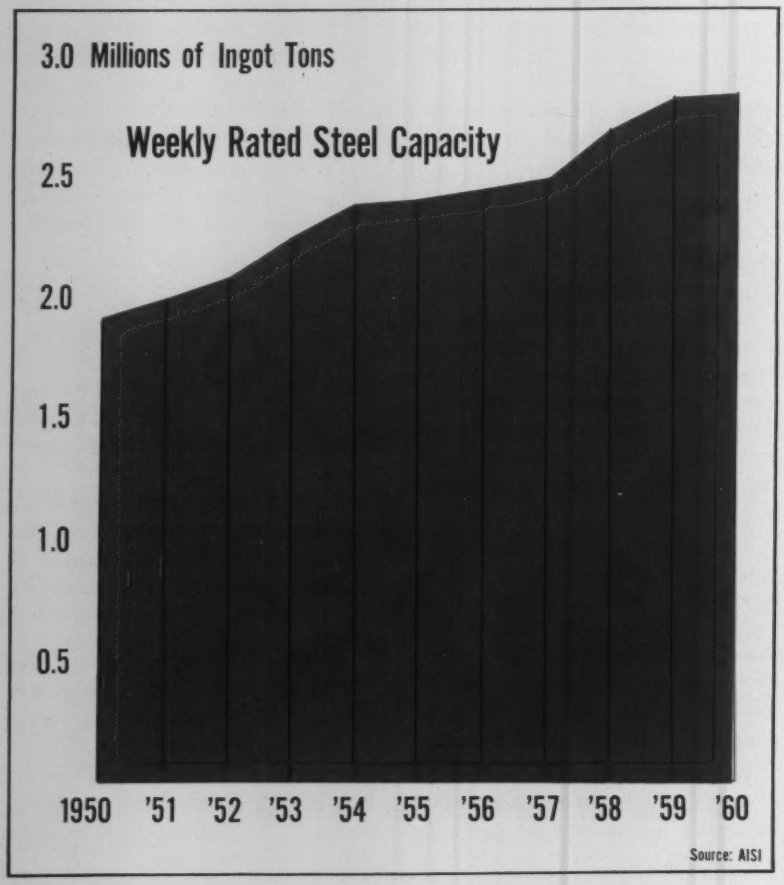
Reporting of these trends in steel gives rise to some reports that the steel market is due for a severe jolt soon. This is not likely. At least it isn't likely soon and, if it comes, it will probably strike late this year—or early next year.

The problem of interpreting current markets—while still preserving an objective long-term view—is not easy, especially when most steel users themselves have full order books. To order too little now in the face of high consumption and possible price increases later is not what some users want to face.

Inventory Problem — The big question that most steel consumers hope to answer is: "Shall I build my inventory up to a normally high level in the face of my good business? Or will the mills take care of me on much faster notice without my having to pile up inventory?"

It isn't a question of actual demand for steel that is to be chewed up and consumed by manufacturers. That rate, which is now around 7 million tons of finished steel a month (not ingots), may remain

Why Pipelines Filled Fast



high for some time. Seasonal trends this spring will up the rate of consumption for awhile.

The high cost of money, the 30-month steel labor contract, and the substantial steel capacity are back of the feet dragging on inventory building. Most steel users never dreamed they could go so long without steel coming in steadily as they did in the strike. When they found that they could by stretching inventory, buying from warehouses, and importing steel, they feared the post-strike buildup might take months. They have found that the mills snapped back so fast it might not now be necessary to build up their inventory to the point they had in mind.

Up to the Mills—Today, steel users are going to count on the mills to hold part of their inventory. And because there is such a competitive condition among steel companies, the customer will win his way. This means that inventories which—under less capacity and easier money—might have gone to 18 million tons, will go to probably a 13 million ton level and no more than 15 million tons. This means steel in user hands and in-process inventory.

Little Pressure Now—The long-term labor contract assures that for some time there will be no anxiety on steel supplies. No intense pressure is due until early 1962. Then, the fellows who are taking it easy now will be in there demanding a buildup that will produce a steel tightness lasting until a contract is signed again.

The effect of all this on new order volume is to reduce it to more normal proportions. With consumption high, there is bound to be a good order rate and a good operating rate for several months. But this tendency to force the mills to carry some consumer inventory will cut down the volume of new business soon and will also tend to reduce backlogs.

No Recession Ahead — But is this a forerunner of a recession soon in the steel industry? Hardly. Early in February 1957 the same stories and the same rumors appeared. But it was late in the year before a sharp drop in production took place. Then, the early part of 1957 had been preceded by many months of capacity operations as consumers built up supplies because of the 1956 strike; a strike that was less than 6 weeks duration.

Today, even after a high operations of less than three months—and before that a strike of 116 days—caution and anxiety about a recession in steel are building up. It may not be too early to think about this, but it is too early to expect it to become a fact in the near future.

Time of Service—Since there is a lot of steel chewing up to be done before we have a recession, it looks as if the steel mills are over the barrel on the question of service. If consumers are not going to carry heavy stocks—and they are not going to—then the mills will have to turn on a dime quite often.

That means heavy stocks of semi-finished steel ahead of the mills and considerable stocks of some finished steel that can be processed quickly to final forms will have to be held.

Record Still Likely — But this does not mean too much of a revision in estimates for steel output this year. Where there had been healthy guesses of 130 to 135 million tons, the latest private guesses are running from 120 to 125 million tons. If they are much below that figure, then there is a recession in the winds which few see clearly or care to talk about publicly. Most steel officials are wary of what 1961 will bring, but there are none yet who look for the bottom to drop out of steel.

How Steel Buyers Are Talking

Auto Parts Supplier—"About 25 pct of the steel is now going into inventory. We are going to take another look at things about March or April and then decide whether to start price-hedge buying."

Heat Treating Apparatus Maker—"We're waiting for the 'Soaring Sixties' to hit us, but it's not in sight yet. We're taking in all the steel they send us but warehouses are swamped with steel and probably will start wholesale price cuts soon."

Major Automaker—"We'll add to our inventories in the next two or three months. We have an imbalance situation now. We're striving for a 20-day inventory on all items. Building stocks in anticipation of a possible price hike is costly."

Big Auto Forge Plant—"Our inventory is in good shape. There are some bad spots, but we're far better off than we expected to be at this time. Mills have been shipping us tremendous tonnages of all sizes. We aren't planning any stockpiling this year, but right now we can't because production is too great."

Steelmaking Equipment Maker—"Some of our plants would like to add inventory, but management says no. Sales are not living up to forecasts and tight money is hurting."

Auto Stamper—"We're about where we want to be."

Oil Producer—"We're working like the devil to reduce inventories. Mill deliveries are better than expected, but most important, the oil business is in the worst condition in years."

Are Organization Men Wanted?

Industry Likes Men Who Think for Themselves

Managers with initiative and daring are in demand—not the conformists, according to a survey of top companies.

Safe, group thinking actually works against growth and competition.

▪ Industry wants managers who can manage, not executives turned out of a mold to think and act along "safe" patterns.

Findings in a recent survey made by the Opinion Research Corp., Princeton, N. J., reveal the so-called organization man isn't doing so well in the big companies.

Daring Pays — Neither company presidents nor the organization men themselves believe it's usually true "the plodding are rewarded, the competent penalized."

Just the opposite is true, the presidents say. It's the individualist, rather than the conformist, who is on the way up. And top executives spend time locating these men.

The study, conducted as a project of the ORC's Public Opinion Index for Industry, involved depth interviews with top officers in twelve of the country's largest companies. In addition, 600 middle management men in the same companies were surveyed.

What's Wanted—The top executives have little respect for the man who tries getting along in order to get ahead. "I let a top man go because I couldn't rely on him," one executive says. "He sat around and spent all his time trying to figure out what the hell I thought. . . ."

Another comments, "We push the theory, use your backbone instead of your wishbone. . . . It's no different than it's ever been. It takes guts to disagree. Out of disagreement comes new ideas and constructive forging ahead."

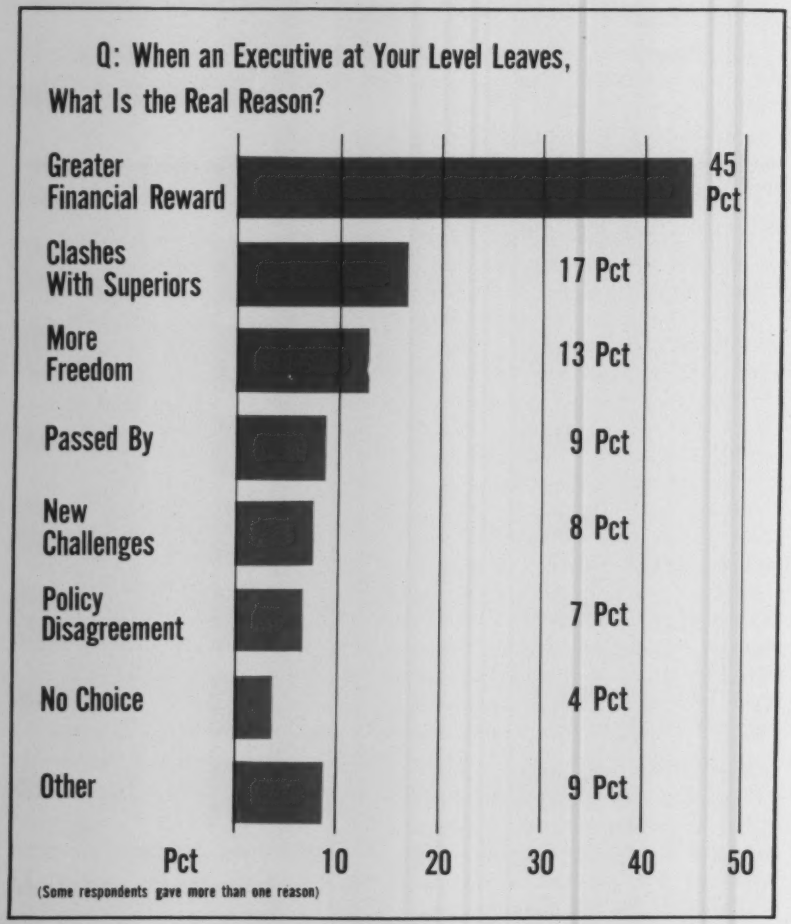
The men in the president's chair have sound grounds for objecting to conformity. The feeling is based on more than principle. Conformity works at cross purposes with the goals the top officers are shooting for—growth, competition, flexibility.

"We're in a growth industry," says one, "and you can't continue to grow unless you have a bunch of ambitious go-getters. No one person can handle it all."

"It's my honest belief," says another, "that top management in most cases is looking for the uncommon man — uncommon within reason. By that I mean you can't afford the star who tramples everyone . . . but if a man sticks his head up just this much (measuring a couple of inches between thumb and forefinger), he is recognized and tapped right away."

Fixing the Blame — Belief that business rewards the conformists may come from those who don't make the grade, one executive claims. "Maybe they are the mal-

Why Executives Leave



contents who rationalize and say they're being forced into a pattern of conformity. They call it conformity, but it's really a lack of their own competence. They are the ones whose ambitions are greater than their talents and who have their ideas turned down not because they're theirs, but just because they're no damn good."

The presidents admit there are degrees of conformity in all organizations and in most men. But they deny that conformity is the corporation's goal or that organizations create conformity.

Important to the company, the presidents say, is a full test of a man's skill in making risk-taking decisions. The man who doesn't make mistakes is, in the minds of most presidents, either not making decisions or not making very difficult ones.

Ability Counts Most—Most of 600 managers surveyed agree with the presidents on what it takes to get ahead. Individual ability and performance are called crucial. But about 28 pct of those interviewed believe it is important to just "get along." Says one, "Keep your nose clean. Don't stick your neck out. Get on the right team. Be alert to shifts and balance of political power. Blow your own horn in appropriate quarters."

Generally, middle managers feel free to dissent when top managers make a decision. But this varies greatly from company to company.

Harmony Isn't All—It's impossible to avoid some conflicts with other people, the majority of the managers say. And younger managers are even less interested in avoiding conflicts. Among the most ambitious managers—those who want to become chairman, president, or executive vice president—harmony is not the prime objective.

The managers, as a group, don't feel hemmed in by the organization. The majority say their company is favorable to changes. They believe the freedom in their job is adequate. And they'd choose an executive career in business all over again.

Market Research: It Gets Results

Small and medium-size companies can use market research as profitably as do large companies.

It can point out prospective customers and show you their needs.

▪ "Market research? Surveys? The thought alone was enough to scare us. These are programs for big multi-million dollar corporations," comments a sales executive for a steel foundry.

This reaction isn't unusual. Small and medium-size companies often shy away from market studies. The executives don't understand them or what they can do. Or, if the company has been in its field a long time, such studies are considered unnecessary.

Strong Steel Foundry Co., Buffalo, learned otherwise. And it found more than 400 new sales prospects as a result of its first efforts in market research.

No Place to Go? — "It sounds incredible that a company that has been in business for 51 years didn't know where and how to increase its market. But along came the 1958 recession and we were like the little boy who was all dressed up and had no place to go," says J. F. Bergmann, assistant sales manager at Strong.

It didn't know what to do, that is, until C. P. Champlin, Jr., executive vice president asked: "What about a survey of our markets? Why can't we make one?" The company could — and did, under the direction of Mr. Champlin.

All sales records for the period from 1950 through 1958 were analyzed. Every customer was classified by Standard Industrial Classification number; number of plant workers was also noted on the sales card. This data revealed which S.I.C. classifications were the best customers.

Pinpointing Customers — Two groups accounted for 94 pct of Strong's total sales. Companies in these groups were then classified by the four-digit code. This showed that about 35 classifications produced 85 pct of the business.

The sales force, consisting of seven manufacturers' agents in the northeastern states, was called in.

Survey Prospects — Then, all territories were reviewed. Lists were made for each territory of companies in the target S.I.C. classifications. These companies were to be surveyed by the sales representatives. The survey questionnaire was kept simple to get the greatest response.

Self-addressed postcards were sent to the sales representatives. The back contained the name, address and S.I.C. code for the company. And one question: Does the company purchase steel castings from outside commercial sources?

It Got Results—Replies started coming in within three days. More detailed questionnaires were sent to the salesmen for each positive reply. And on his next visit to that company, the salesman got as much additional information as possible —type, quality, quantity of castings bought; number of suppliers, etc.

Out of 636 companies surveyed, 415 turned out to be users of steel castings. In most cases, these potential customers were unknown to the company or its sales force.

Has it produced results? Out of 158 potential users in one area alone, Strong received inquiries from 35 companies. And so far, these have resulted in nine purchase orders.

World Production of Steel

	1958 Thousands of net tons	1958 Percent	1959 Thousands of net tons	1959 Percent
United States	85,255	29.5	93,446	29.4
Canada	4,345	1.5	5,914	1.9
European Coal and Steel Community:				
Germany, West	28,930	10.0	32,448	10.2
France	16,100	5.6	16,746	5.3
Benelux	11,930	4.1	12,963	4.1
Italy	6,913	2.4	7,444	2.3
Total ECSC	63,873	22.1	69,601	21.9
United Kingdom	21,914	7.6	22,600	7.1
U. S. S. R. (Russia)	60,481	20.9	66,000	20.8
Japan	13,358	4.6	18,300	5.7
Other Countries*	40,018	13.8	42,000	13.2
World Total**	289,244	100.0	317,861	100.0

* Estimated. ** Excluding Communist China and North Korea.

World Steel Output Sets New Record

■ World steel production rose to a record 318 million tons in 1959. This is a 10 pct increase over the 289 million tons produced in 1958.

But the new figure is only two million tons over the previous record set in 1957, according to the Iron and Steel Div., Business and Services Administration.

International Increase — Early figures compiled by the BDSA show that output rose in all principal steelmaking countries. Canada, all countries except Italy of the European Coal and Steel Community, Japan, and Russia set new records.

Largest tonnage increases were made by the U. S., Russia, Japan and West Germany. However, Japan's 37 pct rate of increase was the highest recorded. Japan became the fifth largest steel producing steel country, displacing France.

Strike Effects—U. S. production, although higher than during the business slump in 1958, suffered from the 116-day steel strike. The BDSA says that with the strike settled and strong demand in prospect, U. S. output should reach an all-time record this year.

The anticipated increase in the U. S. plus heavy world demand should make 1960 a record year for world steel production, as well.

As indication that new records will be set, European countries and Japan are building a number of cold-rolling mills. New basic oxygen steelmaking will add to foreign capacity.

Investigation Underway In Barbed Wire Imports

A group of steel companies who fought for investigation of free importation of barbed wire through two courts finally got their way.

The U. S. Tariff Commission announced the investigation is underway. The probe will determine if barbed wire imports into this country are heavy enough to threaten serious injury to domestic manufacturers.

A public hearing will be held May 10 in Washington.

Attorneys for four steel companies began work on the matter two years ago. The companies sought an import quota or a moderate tariff.

The probe is being made under the so-called escape clause of the Trade Agreements Act. This clause authorizes the Commission to examine the effect on domestic industry of imports of goods on which tariffs have been reduced under reciprocal agreements.

Detroit Steel Plans Big Expansion

Detroit Steel Co. plans to spend $100 million for expansion of its facilities over the next few years, according to Cleveland financier Cyrus S. Eaton.

Directors of Detroit Steel last week approved a stock exchange plan with Portsmouth Corp. which owns 24 pct of Detroit Steel. Mr. Eaton is chairman of Portsmouth. He said the exchange of stock will give Detroit about $45 million in additional assets.

There was no indication whether the expansion would be at the company's Portsmouth, O., mill or at its cold-rolled sheet mill at Detroit.

Two Mills—At Portsmouth, the firm has two blast furnaces and an active capacity of 1 million tons annually. Furnaces at this facility are being converted to oxygen enrichment. The mill produces hot- and cold-rolled strip up to about 52 in. maximum width.

The Detroit facility has no steelmaking capacity. But it turns out cold-reduced strip up to 22 in. maximum width.

The announcement comes on the heels of Detroit Steel's 1959 annual report. Last year the company made a record profit of $11.9 million on sales of $116.7 million. In 1958 the company earned $1.15 million on sales of $61.6 million. Its top sales of $123.3 million were made in 1956.

Norge to Build New Plant

A $10 million expansion for manufacture of gas refrigerators and other gas appliances has been announced by the Norge Div., Borg-Warner Corp.

A new, one-story plant will be built and equipped at Ft. Smith, Ark. It will employ a force of between 1500 to 2000 workers.

Reasoning behind the Arkansas site, Norge says, is the growing southwest market, anticipated growth in the area, and a favorable business climate.

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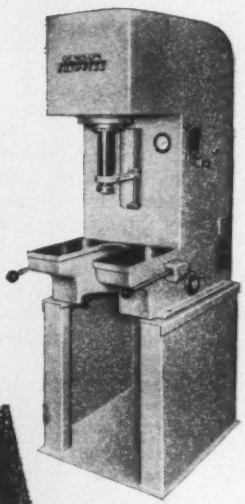

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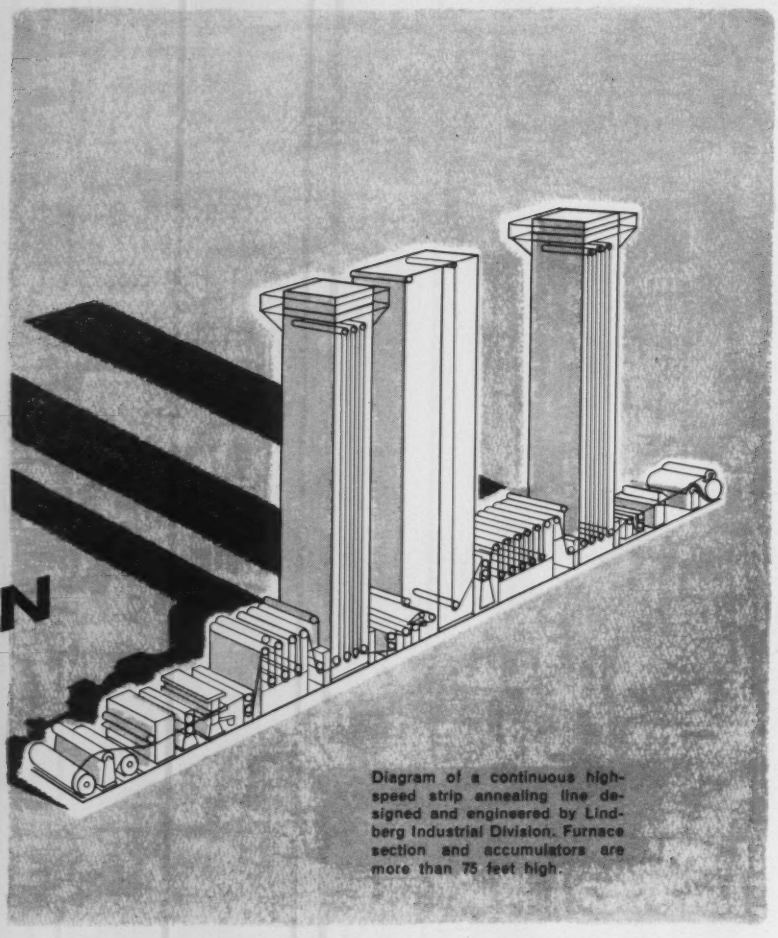

Diagram of a continuous high-speed strip annealing line designed and engineered by Lindberg Industrial Division. Furnace section and accumulators are more than 75 feet high.

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This service covers broad requirements—from plant layout and construction to automated production lines or just specially engineered industrial heating equipment efficiently integrated into your production processes.

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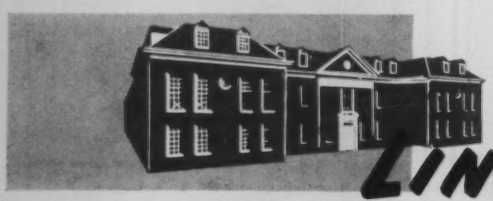

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Raymond N. Carlen

Ticket on the Success Express

Raymond N. Carlen had been with Joseph T. Ryerson & Son, Inc., only nine years when he was named a vice president.

Today he heads up operations research and it's his job to find answers to near-impossible problems.

RAYMOND N. CARLEN: A reputation for solving the near-impossible.

▪ Joseph T. Ryerson & Son, Inc., needed a man to head its growing operations research system. Top officers wanted a man with experience, a hard worker and one who had a taste for tackling the near-impossible. It is no surprise that they turned their selective heads to their own man, Raymond N. Carlen.

Mr. Carlen had a relatively short career with the firm. But in nine years he had advanced steadily and his performance record was highly impressive.

Army Engineer—He was graduated from the Metallurgical School of the University of Illinois in 1942. And shortly afterwards found himself in the Army. He worked his way up to captain in the Corps of Engineers.

He took his first real metalworking job in 1946, and this was with Ryerson, Inland Steel's warehouse arm. His first assignment was in the alloy and stainless steel department. And in the same year he became a sales representative for the same department.

Success Express—Two years later he was named manager of inside sales department. In 1951 he was called to Washington, D. C. There he served as an industrial analyst with the National Production Authority, Iron and Steel Div.

He returned to Ryerson in 1952 and early the next year he was named plant manager of the Boston plant. But he only lasted there a year. By Jan. 1, 1954, he was back in Chicago and promoted to assistant operating superintendent.

And Up Again—In September of that same year he was named assistant to the vice president in charge of operations. In June, 1955, he rose higher on the ladder and was made assistant vice president in charge of all plant operations. In this post he reported directly to the president.

And again, a year later, at the age of 36, Mr. Carlen was named vice president in charge of operations. He now heads up operations research. This is used as a basis for establishing net pricing, optimum inventory and other critical subjects.

Ryerson has been a leader in applying new management techniques. And Mr. Carlen is the executive who is handed the job of putting an operations research team to work to find the answers to these difficult management problems.

Good With the Irons—And outside of work Mr. Carlen is pretty good at solving problems. He has a golf game that usually ends up in the 70's or 80's, a problem many others would like to solve.

He is interested in and devotes much time to community affairs. He has served as the president of the local PTA in the suburban community of Hinsdale and is a member of the board of directors of Hinsdale Community House.

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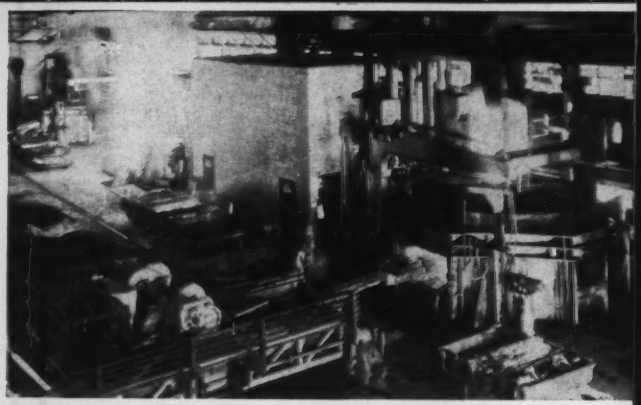

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Labor Force Changes Coming

Your company will need to overhaul its employment policies because of manpower shifts in the 1960's.

More training must be provided—both for young and older workers.

▪ What can industry do to meet the "startling changes" coming in the American labor force?

These changes over the next ten years will mean "a major overhaul of employment policies in many businesses," according to Labor Secretary James P. Mitchell.

His comments came as the Labor Dept. issued a new major study of the U. S. work force. Among the changes pinpointed by Mr. Mitchell for the 1960's are these:

More Beginners — The largest boost in the work force for any ten-year period so far. By 1970 about 87 million will be employed. A big share of the gain will come in the rising number of young workers, 25 years old or less. Nearly 6.5 million will go on payrolls during the '60s. This compares with less than 1 million entering the work force in the 1950's.

There will be a slightly smaller increase in the next worker group —ages 25 to 34 years. Not quite 2 million workers will be added to this bracket by 1970.

And Fewer Experts — Industry will suffer in the '60s from a decline in one of the prime employment groups—workers 35 to 44 years old. Because of the low birth rate in the 1930's, this part of the labor force will drop about 200,000 in the decade.

Beyond this age group, the trend moves the other way again. By 1970 there will be 20 pct more workers 45 years or older, despite earlier retirements.

Besides age, there will be other shifts in the labor force. More women—especially older women—will be employed. More workers will enter the service industries than the production industries. The number of technical, professional, office and sales personnel will show the biggest gain in terms of occupations. Part-time work will increase.

Plan for Change—How can employers prepare for these manpower shifts? Some sound suggestions are included in the Labor Dept. study.

There must be adjustments because of the large number of younger workers joining the labor force. Companies will find they are hiring more inexperienced workers. Labor turnover will certainly increase in this group.

Train and Re-train—Employers are going to have to spend more time on apprentice training, supervision, and safety education. Industry's interest in a sound public school system is bound to grow.

But education and training won't be limited to the young worker. During the '60s, two out of five workers will be 45 years or older. Right now this group includes more than half of the proprietors and managers, about 40 pct of the skilled workers.

For maximum benefit, more training and re-training of older workers will be needed. And there must be less objection to hiring older workers.

More Emphasis on Recruiting

▪ With growth of the young labor force in the '60s, campus recruiting will get more attention. But even now, some improvements could be made.

This came to light in two recent surveys by the American Management Assn. In one case, the AMA interviewed college placement officers. The other survey was made among company personnel executives.

More Planning Needed—Among the companies questioned, almost 25 pct thought their campus recruiting programs were inadequate. Suggestions for improvement included: Better planning to know what jobs are actually available. More briefing of recruiters before they reach the campus. Increasing the recruiter's knowledge about company-wide activities. Allowing the plant a bigger share in recruiting programs. And improving the literature sent to the campus.

How Colleges Feel — College placement officers believe recruiters are generally effective in rating students. But some criticisms were made. There's too much emphasis on personal impressions in hiring, the placement officers say. Recruiters also tend to hire carbon copies of last year's successful hires. And they are afraid of the student who is "different." This is in conflict with other thinking on industry conformists. (P. 74)

Despite all the talk, industry is still shying away from the broadly-trained liberal arts graduate.

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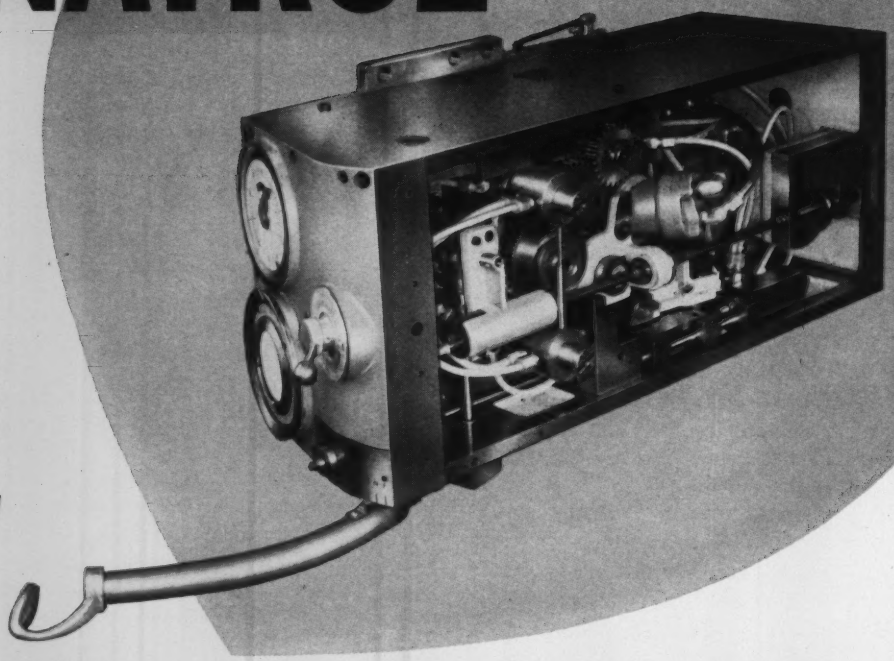

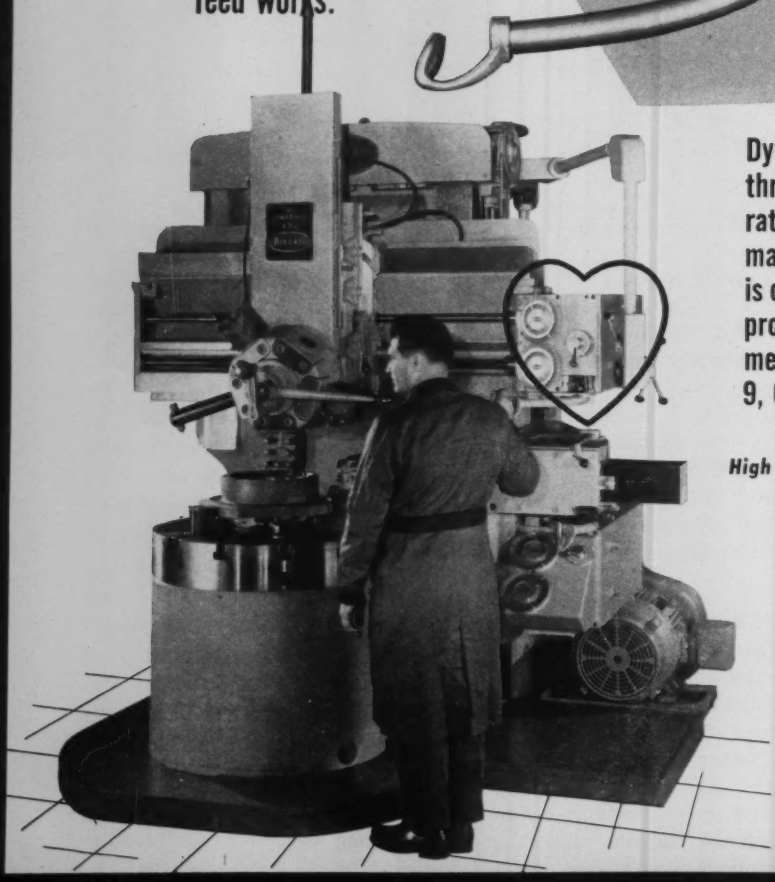

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More Compacts Go to Aluminum

Aluminum Engines Scheduled for Three Others

Reports that engineering problems had killed plans for more aluminum engines are debunked.

But, unlike the Corvair, the new ones will be mounted in the front.—By A. E. Fleming.

▪ Has anything happened to automakers' plans to use aluminum engines in the next crop of compact cars? No, according to industry sources.

Aluminum suppliers claim Corvair's aluminum engine monopoly will be short-lived. They say that at least three new compact cars, powered by aluminum engines, will be brought out this fall. And another compact car introduced last fall may switch from an iron block to aluminum for its engine.

Buick, Oldsmobile and Dodge will each introduce small cars powered by aluminum engines. And Valiant may make the switch. The engines will be front-mounted and liquid-cooled. The Corvair engine is air-cooled and mounted in the rear of the car.

Far From Dead—Rumors that engineering problems had killed new aluminum engines for at least another year were denied by one Big Three automaker. "Reports of impeded progress on our aluminum engine program for coming compacts are conjecture. We won't have aluminum engines for regular-size cars in the next year, but look for news to break about aluminum in new compacts in about six months," the source says.

A good bet to bow next fall is an aluminum V-8. It will power the compact Buick and Oldsmobile. Production is scheduled to begin before Labor Day. The engine has a 215 cu in. displacement and will yield around 150 hp. Buick will handle the engine manufacture at Flint, Mich. Cylinder blocks will be aluminum, but cylinder barrels may be cast iron.

Pontiac, using a Corvair body shell, had its eye on the V-8. But the idea was vetoed and the power advantage was willed to Buick and Olds for their bigger models. Besides, with the Corvair body, the Pontiac front end isn't roomy enough to handle a V-8. Pontiac may settle for a 45 degree tilted 4-cylinder engine with a displacement near 200 cu in. Cylinder block is gray iron, not aluminum. It's possible that a variety of parts from Pontiac's present V-8 may be used, including pistons, rings and bearings.

More Engines — Reports also were widespread that Pontiac had been trying out a more powerful version of Corvair's flat, 6-cylinder engine. But this notion apparently has passed. The increased power in the Corvair engine came from larger cylinder bores, resulting in a bigger cubic inch displacement.

Chrysler Corp. has a couple aluminum engines in the works for its Dodge compact, and possibly the Valiant. Displacement of one goes

Engines Inspected After Endurance Run

PIECE BY PIECE: After 120 hour endurance test at Chrysler Corp.'s Trenton, Mich., engine plant, engines are torn down piece by piece under the supervision of R. C. Johnson, resident engineer.

170 cu in., the other 225 cu in. They are 6-cylinder engines that slant 30 degrees to the right, like the sixes introduced last fall in Plymouths, Valiants and Darts. Present sixes have cast iron cylinder blocks.

Ford Motor Co. is working on aluminum powerplants for its compacts, but seems to be lagging a bit. However, in the interest of being competitive, Ford is working on two aluminum V-8 engine blocks—one for standard-size models and another version for its compacts. And it is rumored that a V-4 that might go into Ford's Volkswagen-size car in the 1962 model year.

AMC Boosts Output, Makes Export Gains

Hints of first-quarter production cutbacks by U. S. car makers apparently do not apply to American Motors. On Feb. 8 the company began turning out cars around the clock by adding a third shift to the final assembly line at Kenosha, Wis. AM is the only company working on a 24-hour, six-day basis.

Production is running at peak levels, near 11,000 cars a week. In January, 40,000 units were produced. February will top that by a couple thousand. As the third shift gets going, output will build up gradually to allow a rescheduling of the flow of parts and materials. Personnel have been added, and AM employment now totals 26,000 in Wisconsin.

AM also is preparing for more body production at a new leased plant in Kenosha. By summer new engine facilities will be completed, too.

Exports Increase — Contrary to another trend, shipments of Ramblers out of the U. S. climbed in 1959. They reached a peak of 5180 units, up 58 pct over 1958. Exports represented just over 1 pct of Rambler's total 1959 production of 401,000.

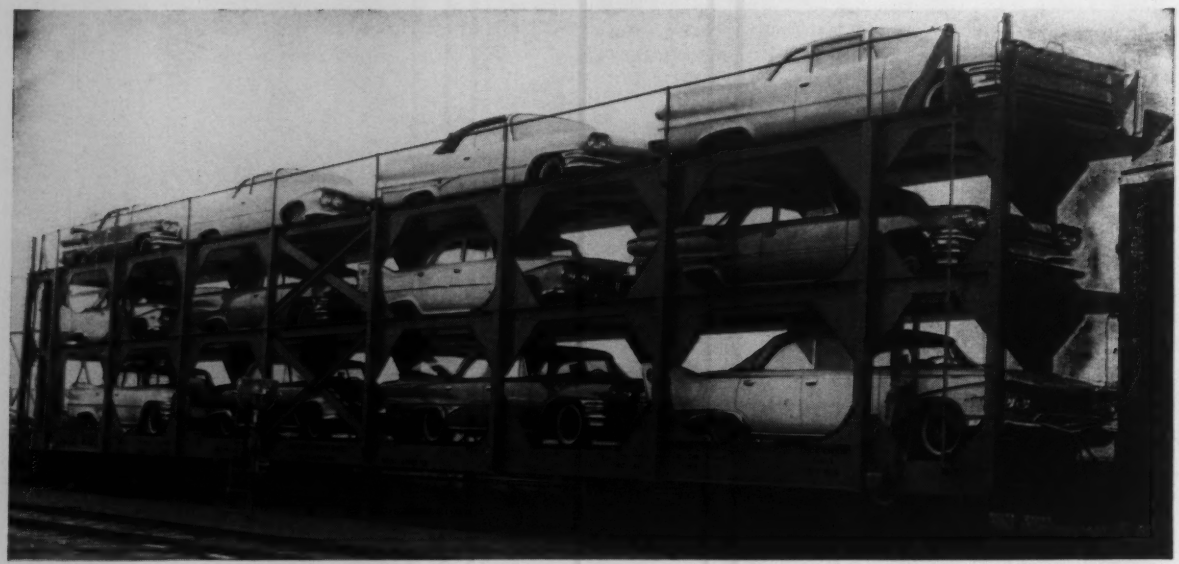
"Rambler sales abroad have continued to climb," says W. H. Thoreson, director of automotive export for AM, "because of a continually increasing demand for compact cars with a good balance between size, power and economy. Many of the cars built abroad are too small for average family use, and are underpowered."

Easy on Gas—Despite the presence of the Big Three's compact cars, Rambler claimed top honors in the NASCAR economy trials at Daytona Beach. All cars checked in with eye-popping performances. However, the trials were run under ideal conditions by expert drivers to determine the maximum mileages of stock cars. The autos putted around a flat track at a steady 25 mph.

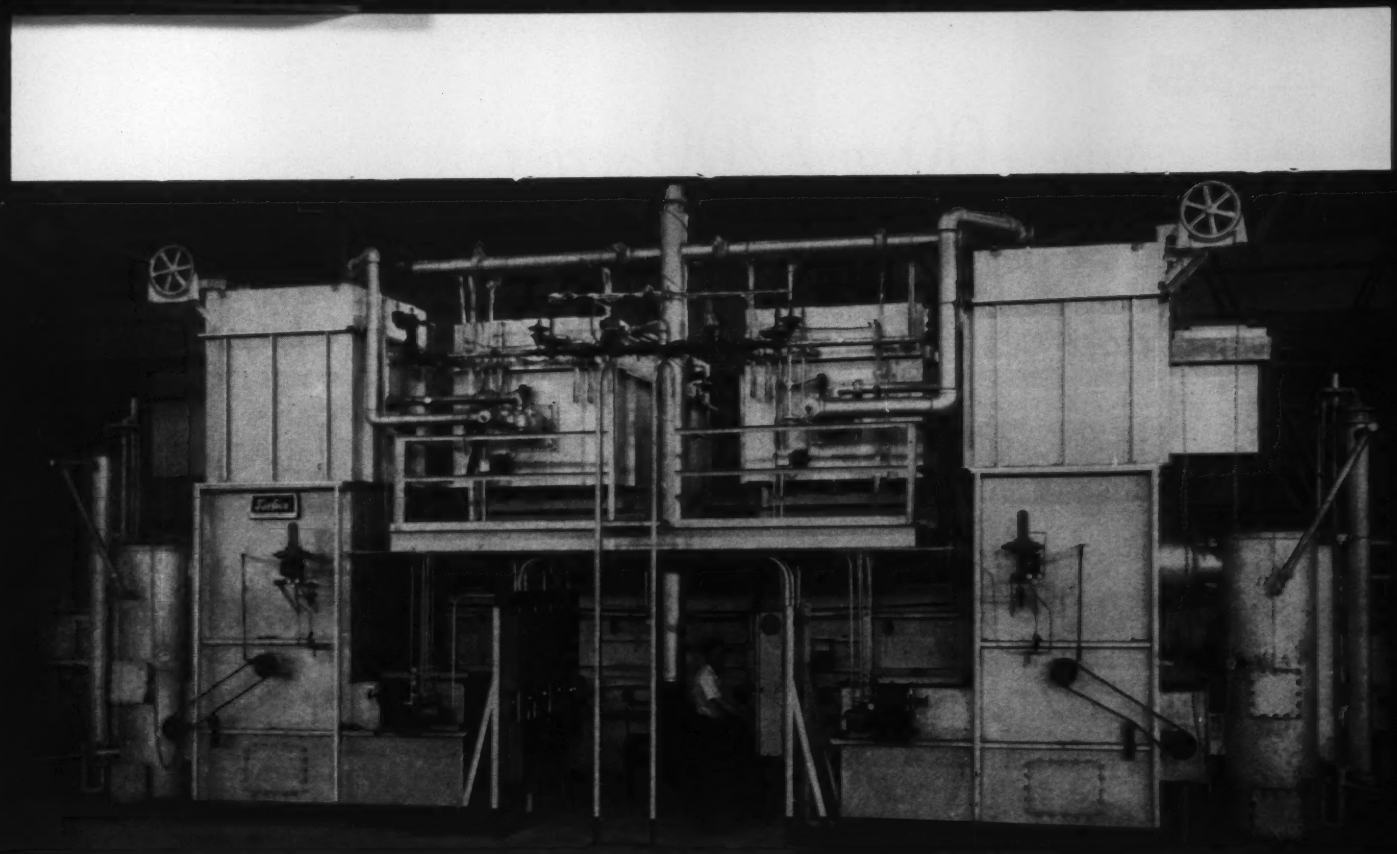
A Rambler American, equipped with a 125 hp, 6-cyl engine and overdrive, averaged 51.28 mpg. Best results of the competition: Falcon 44.61, Valiant 41.80; Corvair 39.88; Lark 32.97.

Rambler made the 125 hp engine available in the American series in late January. The 100-in wheelbase Americans are accounting for 25 pct to 30 pct of total Rambler output. Rambler's 108-in. wheelbase model takes from 60 pct to 70 pct of production. The rest goes to the 117-in. wheelbase Ambassador series.

New Rail Car Carries Automobiles to Market



TRIPLE DECKER: Chrysler Corp. is shipping cars from St. Louis to the Southwest on three deck flat-cars. The rail-cars, built for the Frisco Railroad by the Pullman-Standard Co., are 83 ft long.



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This furnace is one of Scovill Manufacturing Company's (Waterbury, Connecticut) answers to the threat of imported brass and copper mill products.

Scovill is after new highs in production and quality in its new streamlined tube mill at New Milford, Conn. This continuous roller hearth furnace, equipped with Surface Power Convection, helps achieve both goals. It anneals and cools 8,000 lbs. of brass and cupro-nickel tubing an hour. At the same time, it produces tubing of superior physical properties because it maintains temperature uniformity at plus-minus 8° F.

Such process speeds and temperature uniformity are possible only with Surface Power Convection, the most important advance in convection heat transfer in 20 years. Ask your Surface representative how you can apply this profitable new technology to your products. Write for Bulletin SC-182.

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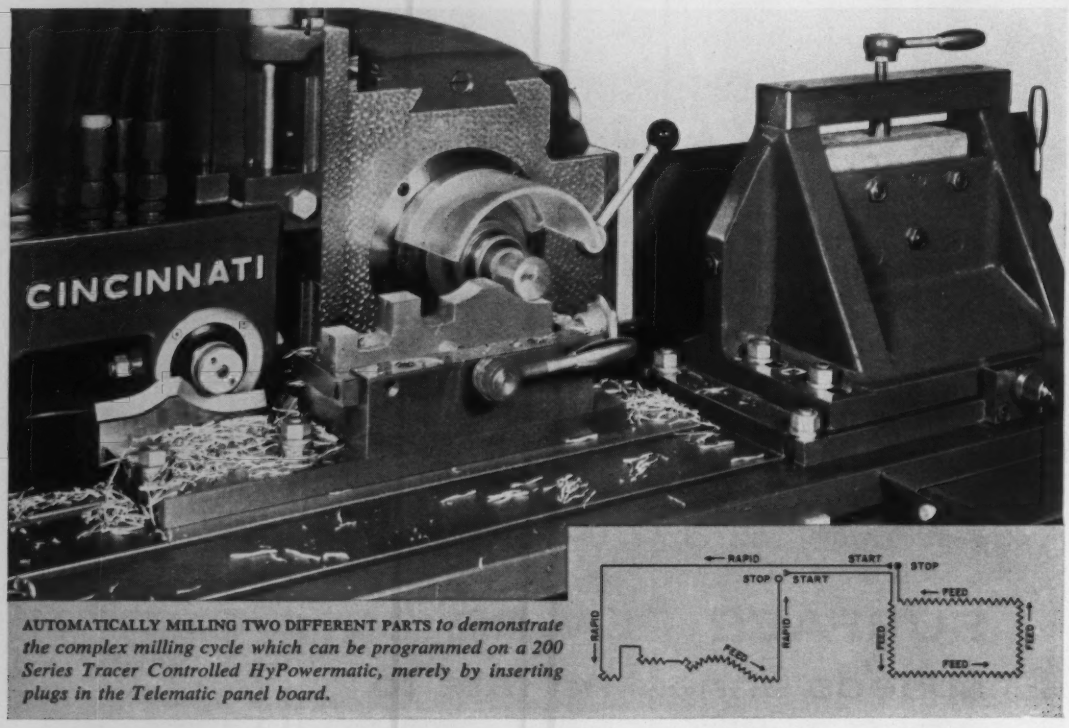

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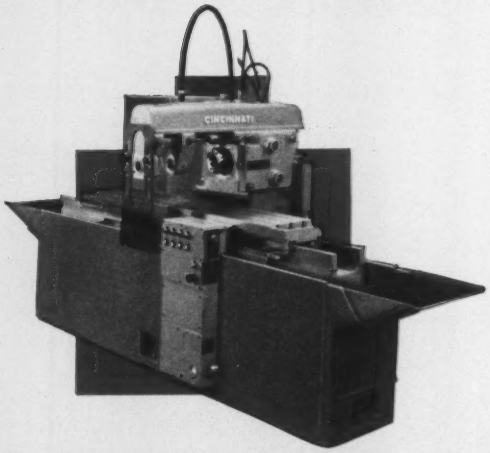
Good news for job shop and production shop managers. New CINCINNATI 100 and 200 Series HyPowermatic Milling Machines have the flexibility for both short runs and production runs. They incorporate several exclusive features, while retaining the rapid metal cutting characteristics of heavier members of the line. Hydra-mech table drive, for example, automatically eliminates backlash and assures smooth metal cutting for up-milling or down-milling, feeding right or left. Bed ways are square gibbed, flame hardened and automatically lubricated. Chips and cutting fluid are channeled into compartments at ends of the bed, keeping working area clean.

New CINCINNATI 100 and 200 Series HyPowermatics (7½ and 10 hp) are built in plain and duplex styles. Versatile Telematic Control is standard equipment for programming automatic milling cycles on Automatic Rise and Fall and Tracer Controlled types. New catalog M-2020-1, containing details, will be sent on request. **Milling Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**



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U. S. to Give India More Aid

Funds Will Come From U.S. Development Loan Fund

President Eisenhower wants to increase aid to India by as much as $130 million annually.

Indian industry is expanding rapidly. It wants to buy U. S. equipment.—By G. H. Baker.

▪ A big upward surge of U. S. aid to India is in the works. President Eisenhower plans to step up the yearly sums available to India from the present rate of $150-$170 million to $250-$300 million.

A large portion of the extra cash will go for purchase of machines and industrial equipment in the United States.

What India Wants—India wants to buy food-processing equipment, farm machinery and power-generating equipment.

Chief source of the increased funds will likely be the U. S. Development Loan Fund. This is the new "easy terms" international lending agency.

Industrial Expansion—Here's a summary of recent industrial build-up in India: Rolls-Royce engines for transport aircraft will be produced under license in India. Goodyear is building a $12 million tire and tube plant near New Delhi. Dayton Rubber Co. is active in a government - industry plant in Kerala.

A blast furnace was just added at Durgapur Steel Works, at Rourkela. (Annual capacity of the Durgapur Works: 1 million ingot tons of iron and steel. It's said to be the most efficient mill in all of Asia.) The existing 1,000,000-ton capacity at each of the present three steel mills is to be doubled in the next five years. A fourth major steel mill will be built near Bokara. A steel foundry equipped to turn out 7000 tons of railway castings annually is now being built in Chittaranjan.

Greater Capacity—Government is pushing a program of incentives to build more forging capacity. Now, 22 plants turn out 40,000 tons of forgings yearly. This capacity is expected to rise to about 72,000 tons.

Machine tool output at the Hindustan plant in Bangalore is to rise from 1000 units a year to 2000. About $2.5 million has been set aside to buy imported equipment.

A heavy structural fabricating works (capacity: 10,000 tons annually) and a heavy plant and ship works (capacity: 12,000 tons annually) are to be built within the next few years.

Other new factories now building: Thermometers, electric motors, cylindrical grinding machines, paper manufacture, locomotives, telephones, leather goods, ships.

An American 10-Year Plan

▪ President Eisenhower is going to match Russia's state planning with an American-style 10-year plan.

The President has named an 11-man commission headed by Dr. Henry Wriston, former president of Brown University. The commission will develop a broad outline of national goals for the next decade and beyond.

Future Goals — Long-range national goals in education, health, living standards and other social areas, and methods of meeting the goals, will be recommended. The President has said a broad plan is needed to help the U. S. meet the test of "an aggressive Communist conspiracy, supported by rapidly growing economic and military strength."

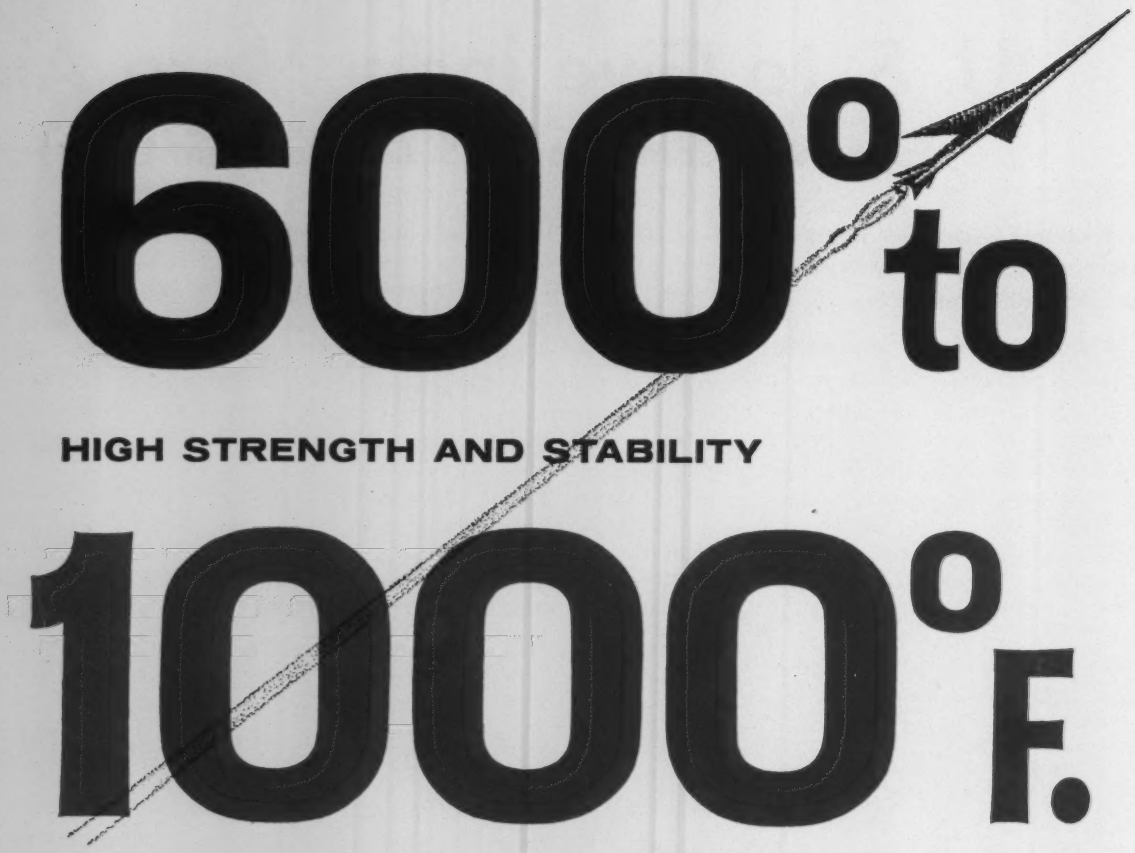
The commission is charged with identifying the "great issues of our generation" and laying down methods of meeting them. The President took several steps to avoid having the commission's output sound like an American version of Russian state planning.

It will operate through the American Assembly, an adjunct of Columbia University. Dr. Wriston also heads the Assembly. President Eisenhower created the Assembly when he was head of Columbia, to conduct studies of broad national interest.

Private Funds—It will operate with funds from private foundations. There are no government officials among its members. But several have been in government.

He has asked the group to report to him by January, before his White House term expires. But he said he was more interested in the "breadth and accuracy of the report," rather than in the exact timing.

Frank Pace, former Army secretary and now board chairman of General Dynamics Corp., is vice chairman. Several former university heads are among the members, as is AFL-CIO president George Meany.



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AM 350 is available in sheet, strip, foil, small bars and wire. AM 355, best suited for heavier sections, is available in forgings, forging billets, plates, bars, wire, sheet and strip.

For further information, see your A-L sales engineer or write for the new technical booklet, "AM 350 and AM 355," **Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.**

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How to Sell the Farwest Market

Area's New or Expanding Plants Are Sales Targets

Expansion in the Farwest keeps widening the demand for products and services.

Metalworkers and fabricators in Southern Calif. spent $28 million on new or bigger plants last year.—By R. R. Kay.

▪ The march of people and plants to the Farwest continues. And they create a demand for an ever-widening range of products and services.

New or Larger—Last year, firms in prime and fabricated metal products invested over $28 million in southern California alone. The money went for new and expanding plants.

Here's a rundown of the latest developments:

Reliance Steel & Aluminum Co. —steel, aluminum, magnesium panels for mobile homes. Collins Machinery Corp. — threading and cutting machinery.

Magna Products, Inc.—corrosion measurement instruments. Craft Wire Products—wire display racks. Air-Factors, Inc.—air conditioning and heating equipment. Metal Treaters—heat treating.

Switches, Seats, and Boats—General Logistics Div. of Aeroquip Corp. — materials handling equipment. Lighting Dynamics, Inc.— industrial and residential lighting fixtures. Jay-El Products, Inc.— switches and automatic inflators.

Lyon Metal Products, Inc.—steel lockers, seats, shelving. Rikton Corp.—speed boats and camping trailers. Servomechanisms, Inc.— electro-mechanical devices for the aircraft-missile industry.

Technical Ceramics Div. of Gladding McBean & Co.—ceramics and cermets for the missile industry. Christie Electric Corp. — battery chargers and testers. Tasker Instruments Corp.—air traffic control computers.

Preshaw & Thompson, Inc.— sheet metal and machine shop. Autonetics Div. of North American Aviation Co.—computers for industrial systems.

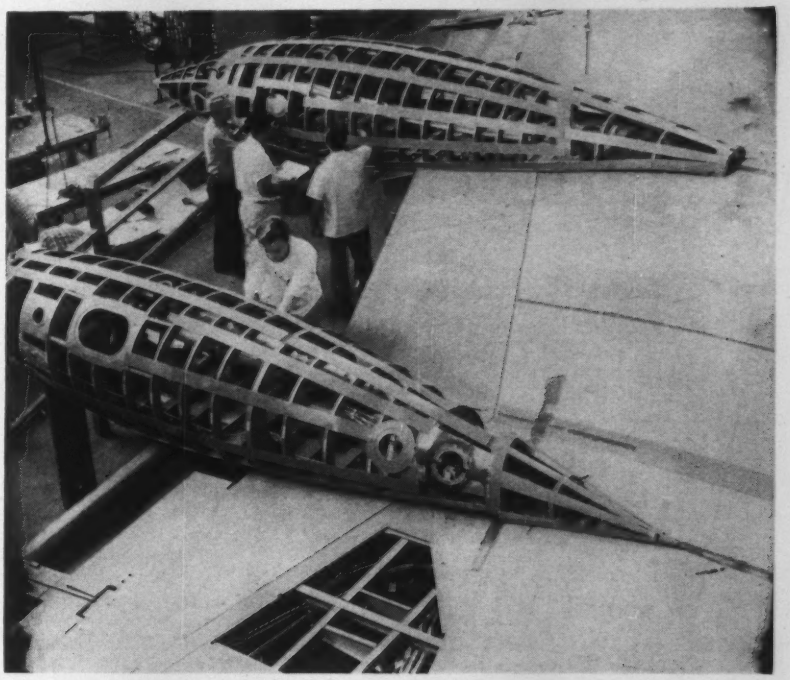
Electronic Growth — Electronic industry growth in southern California did very well last year. The industry plowed $28 million into new facilities. The total equals spending by the prime and fabricated metal products group. There's every reason to believe that growth will keep up the pace this year.

Here are a few electronic plants on the go:

Industrial Electronic Engineers —automatic systems and in-line digital displays. Cornell - Dubilier Electric Corp.—delay lines, wave band filters, capacitors.

General Telephone & Electronics Corp. has formed General Telephone & Electronics Laboratories, Inc.

All in the Interest of Reducing Shock



SPEED CAPSULES: Anti-shock bodies or speed capsules are shown on wings of mockup of new Convair 660 jetliner. Capsules are designed to straighten air flow and postpone formation of a shock wave. They are also used as added fuel tanks, in addition to those in wings.

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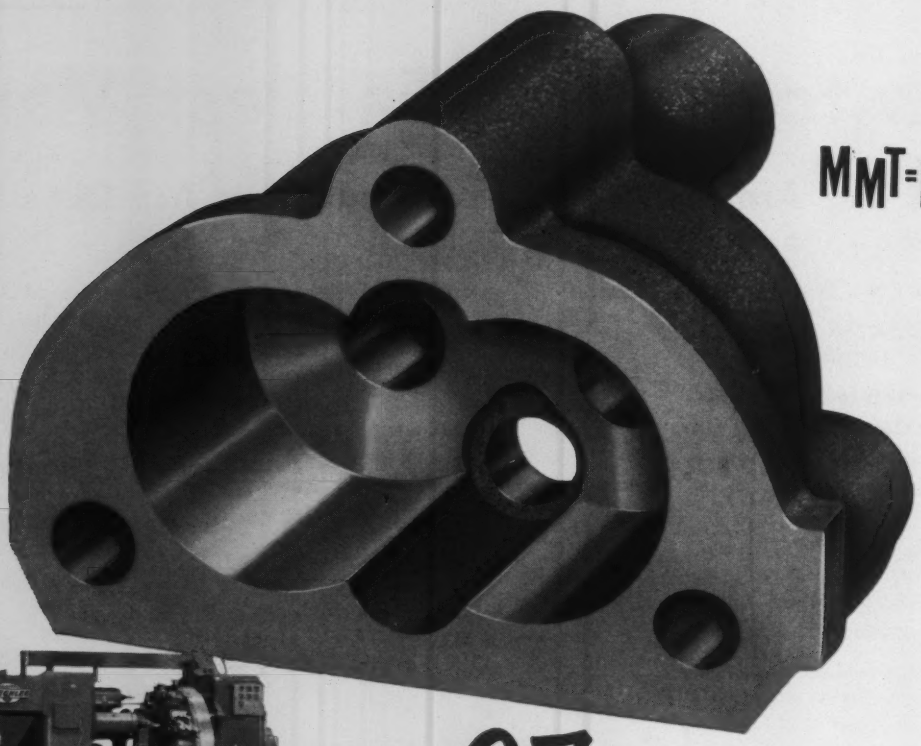

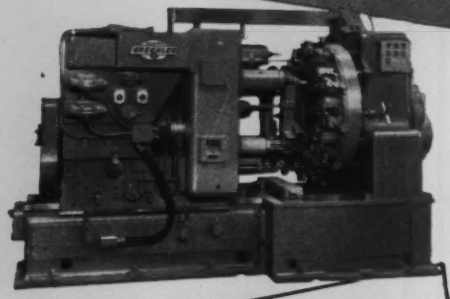

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STATION 12 — finish ream, finish bore

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Needed: More Ways to Cut Costs

Expect Metalworkers to Look in Areas Once By-Passed

Ever higher labor costs are forcing manufacturers to look for more ways to cut over-all costs.

Automatic assembly lines have been overlooked. But there are many areas where they will pay. —By R. H. Eshelman.

■ Labor costs continue to rise. And the outlook is for more of the same. So, metalworkers can be expected to seek more ways to trim over-all production costs. But look for the search to center on previously neglected areas.

One of the most promising is assembly. There have been some spectacular successes. And there have been unpublicized failures. But there are thousands of operations where automatic assembly can pay off.

Success and Failure — For instance, it's been reported that an auto parts supplier now assembles 2600 spark plugs an hour on an automatic machine run by one man. Before, the production line was manned by 21 workers. And they turned out only 5000 units per hour.

But some attempts at automatic assembly have proved costly failures. Often cited is engine head assembly. On some operations auto makers have had to give up and back away from the most advanced methods. In rebuttal, it may be that the shop was unprepared for the radical switch in technique.

Teamwork a Must—Since assembly automation first made big news, however, technology has advanced. Experience and advances in electronics have helped. A specialist highly successful in the field of automatic assembly, Bodine Corp. of Bridgeport, Conn. offers some sound advice.

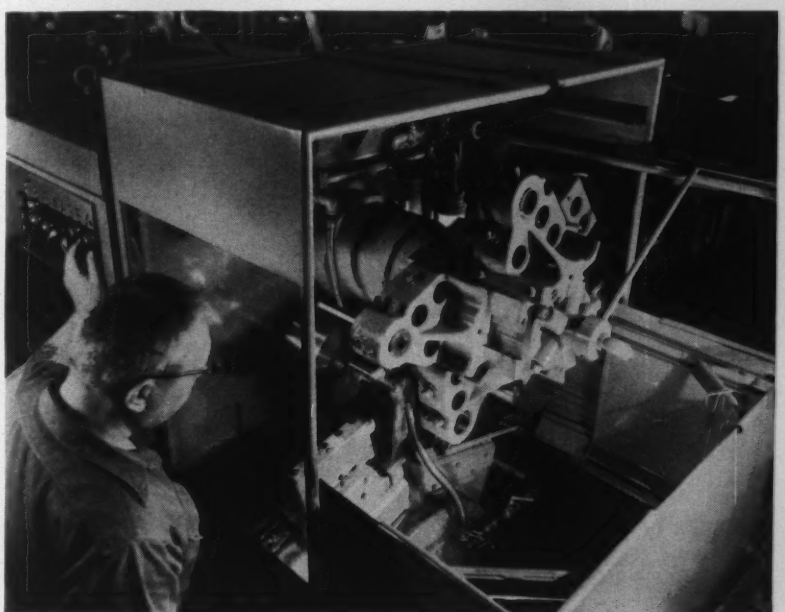
Possibilities of tooling for assembly are endless, the firm's engineers note. But collaboration by product designers and process engineers is an absolute necessity, they declare.

What Makes Success?—The reason: Complete success often depends on making parts compatible with orientation and machine feeding needs. This problem can often be met by simple modification. A shaft may be weighted at one end, or a nut elongated without interfering with its design function.

Automatic assembly can pay outside of the automotive field. Experts cite the many small parts in electrical, electronic, appliance, and military production. A sub-assembly that's standard for a range of products often will give the volume needed.

Bodine's approach is to cut capital costs for a job by using standard machine units and parts. Such spindles, bases, drives, etc., also allow off-the-shelf replacement. And they cut special engineering time.

Automation Pays in a Tool Room



SMALL LOT MACHINING: Tool steel casings and die shells are machined automatically in the tool room of Lamson & Sessions Co., Cleveland. This Warner & Swasey 2AC single spindle chucking automatic does the job six times faster than former hand lathe methods. Average lots range from 15 to 30 pieces. It has run as few as two pieces economically.

INDUSTRIAL BRIEFS

Sea Story—Ingalls Shipbuilding Corp., Pascagoula, Miss., has a $4.9 million contract for activation, repair and conversion of a missile range instrumentation ship by the U. S. Navy. The ship to be converted is the USS Skidmore Victory. It will give support to the missile and space agencies using the range.

On Credit—A credit of $3 million has been approved by the Export-Import Bank of Washington for Toyo Kohan Co., Ltd., Tokyo, producers of tin plate and cold rolled sheet. The loan will be used to buy two pieces of processing equipment from U. S. manufacturers. Repayment to the bank is scheduled over a 10-year period.

Cool Air — Compressor manufacturing facilities at the Westinghouse air conditioning division, Staunton, Va., have been expanded to include units rated at 20 to 100 tons. Added facilities will provide larger units for use in cooling and air conditioning equipment.

School Bell—A one-week course in corporate product planning and development will be held March 7, Hotel Astor, New York, by the American Management Association's Research and Development Div. It will consist of lectures, case studies and small-group project sessions for discussion of individual problems.

Candidates Elected—The Cutting Tool Manufacturers Assn. has elected G. N. Popham, Gorham Tool Co., association president. K. R. Beardslee, Metallurgical Products Div. of General Electric, was elected vice president.

Hot Buy—Lewis Bolt & Nut Co.'s hot dip galvanizing facilities at Minneapolis have been purchased by the Metal Coating Corp., Chicago. The Electroplating Div., St. Paul will not be affected. The company intends to include high strength special design and rust resisting fasteners in its operation.

Marketing in Milan — Dow Chemical International Ltd., S. A. has formed a new company, Dow Chimica Italiana S.p.A. It will build a new multi-million dollar manufacturing plant in Italy. The subsidiary will open its marketing office in Milan.

White Named to Post—W. A. White, Sr., former government official and industry executive, has been named administrator, Business and Defense Services Administration. Mr. White, a consultant with Union Carbide & Carbon Corp., succeeds H. B. McCoy, who recently retired.

Motor City—Large main drive motors used on a hot strip finishing train will power a new seven-stand, 80 in. mill being built at Detroit by Great Lakes Steel Corp. It is part of an $8 million electrical system being supplied by General Electric Co.

Computing More Business—Computer Div., Bendix Aviation Corp. will build a computer plant at Los Angeles. It will manufacture medium-sized the G-15 digital computer and accessories and a new line of high-speed transistorized computing equipment. The plant is expected to increase marketing facilities by 50 pct during 1960.

"Your recent promotion makes you one of the gang, Sidney, but remember—it's that old gang of MINE!"

Florida Fluids — Air Reduction Sales Co. will build a commercial liquid air separation plant in Tampa, Fla. The multi-million dollar plant will have a capacity of 25 tons per day of oxygen, nitrogen and argon. Groundbreaking will take place in March. Completion is scheduled for the summer.

Underground—Construction of a nuclear reactor near Saxton, Pa., for the Saxton Nuclear Experimental Corp., is under way. Excavation work for the removal of about 60,000 cu yds of earth will take about three months. In this "pit" a building 40 to 50 pct below ground level will be built.

Air Waves—Revenue cargo ton miles flown by United Air Lines in 1964 will almost triple 1958 volume, the company forecasts. United is opposing renewal of the operating authority for the all-cargo carriers and the provision of subsidy for all-cargo lines.

Curtis Constructing—Curtis Industries, Inc., Cleveland, plans for immediate construction of a new $1 million plant and office headquarters at Eastlake. The company will centralize all its present activities in the new 95,000 sq ft building. Curtis manufactures and distributes keys and automotive replacement parts.

New Home—Abbott Screw & Mfg. Co., Chicago, has purchased land and a building at 6525 N. Clark St. for general offices and a warehouse. Abbott's screw machine. stamping and cold-heading divisions will remain at their former locations.

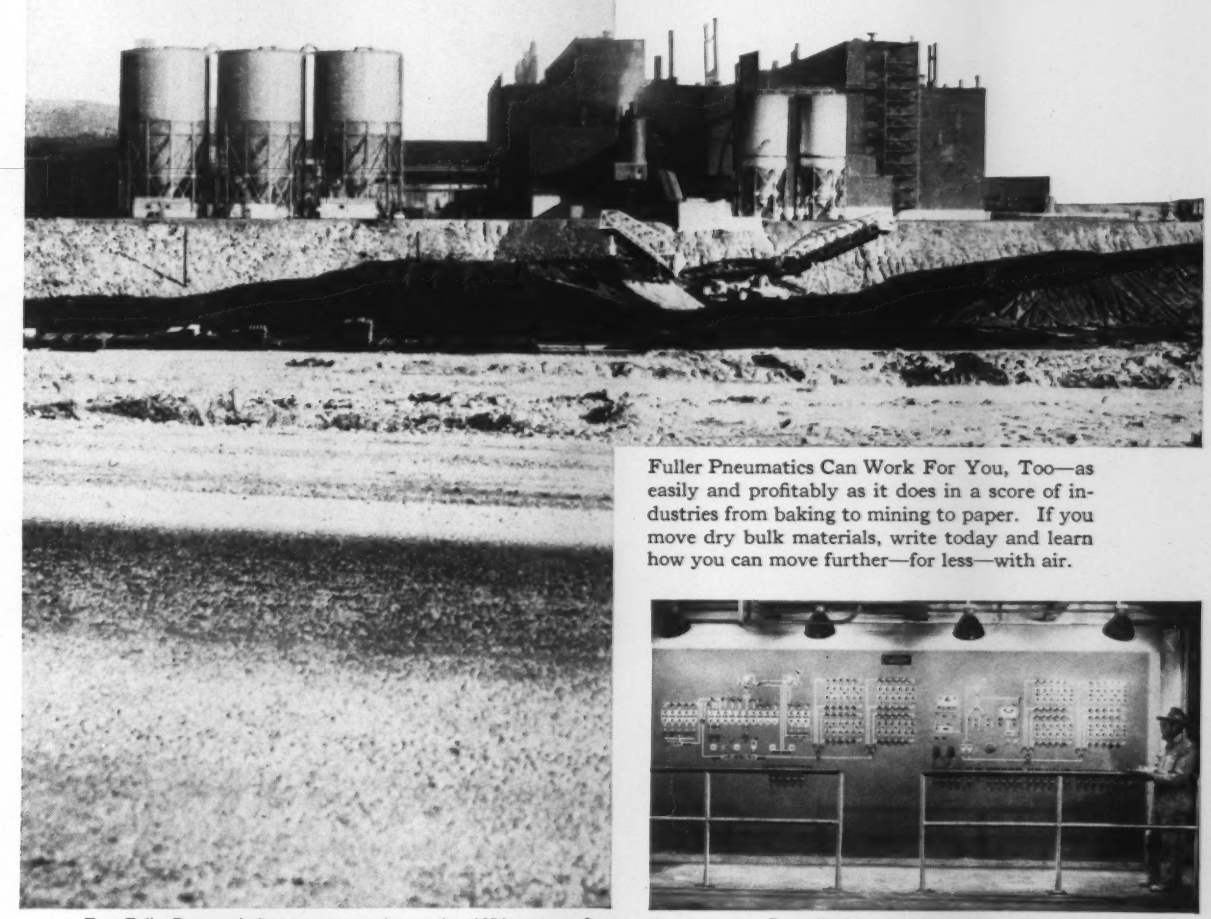
Yankee Vessel—A 165-ton steel reactor vessel for New England's first nuclear electric generating station has been shipped from the Babcock & Wilcox Co.'s Boiler Div. works, Barberton, O. The vessel will be delivered to the Yankee Atomic Electric Co., Rowe, Mass. Ten New England utilities have cooperated to build the station.

How Pneumatic Conveying Helps Make New Mining Process Economically Practical

Taconite processing is typical of the many varied, cost-saving applications for Fuller Pneumatic Conveying.

They're turning low assay iron ore into rich pellets on the Mesabi these days. Moving additives for pelletizing, Fuller plays a special role in this feat of engineering and production economy.

Fuller Pneumatic Conveying Systems are carrying fine anthracite screenings, soda ash, and bentonite from siding to storage to processing—with speed, safety, sanitation, and efficiency. With few moving parts to wear out and powered by inexpensive low-pressure air, Fuller Pneumatic Conveying Systems speed dry bulk materials *anywhere that a pipeline can be run:* under ground, up through floors, around corners . . . for far greater distances and at substantially lower cost than possible with mechanical conveyors.



Four Fuller Pneumatic Systems can speed more than 307 long *tons* of additives through this huge Taconite Pelletizing Plant in a single day.

Fuller Pneumatics Can Work For You, Too—as easily and profitably as it does in a score of industries from baking to mining to paper. If you move dry bulk materials, write today and learn how you can move further—for less—with air.

Centralized control is provided by giant panel designed and manufactured by Fuller.

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY
122 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Fuller
. . . . pioneers in harnessing AIR

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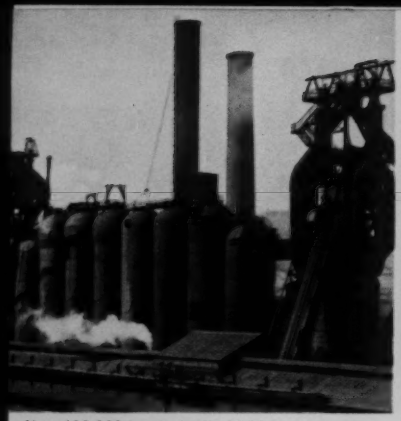
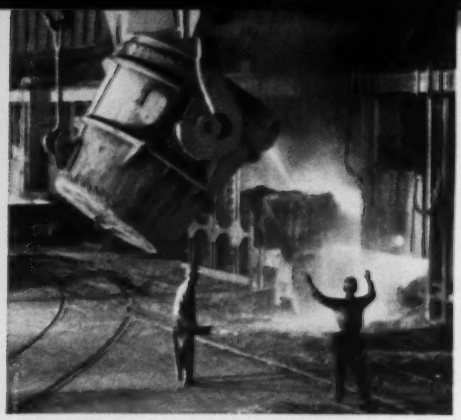
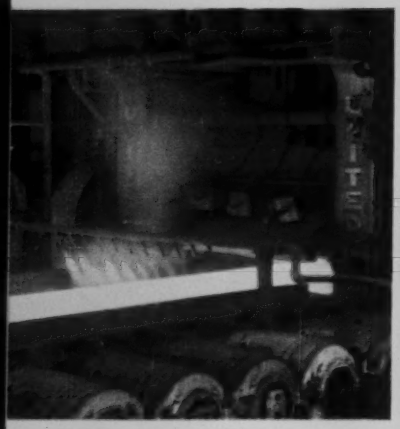


New 400,000-ton capacity blast furnace

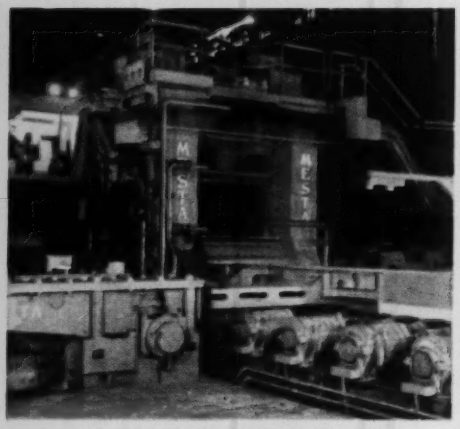
New $11 million basic oxygen furnace facility



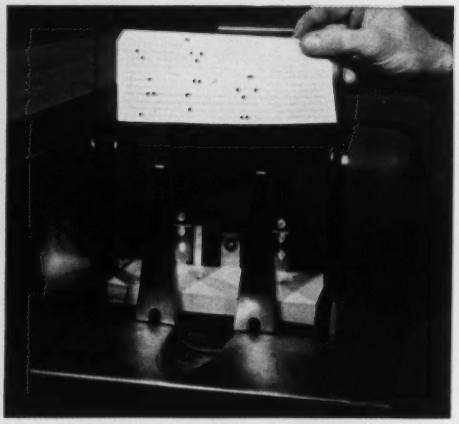
New $74 million, 11-furnace open hearth shop



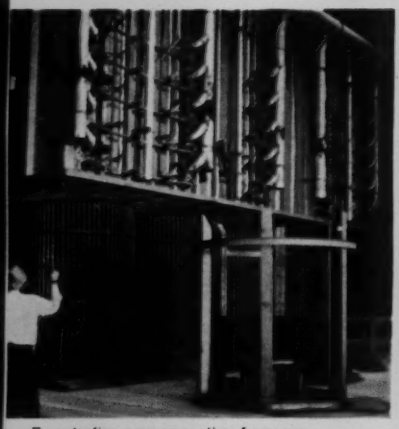
New horizontal scale breaker



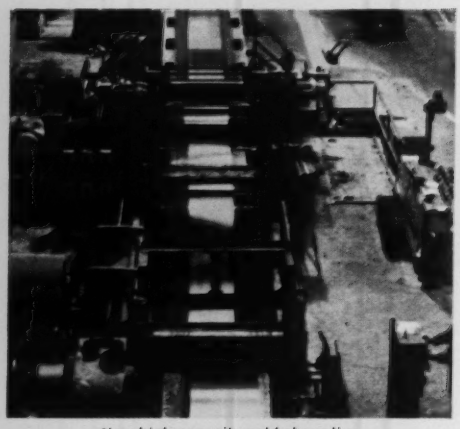
New $12 million reversing roughing mill



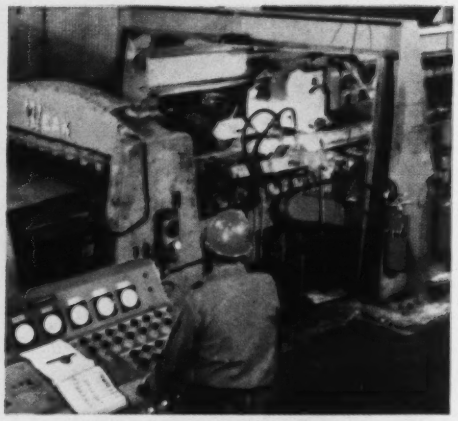
New punch-card controls for quality control



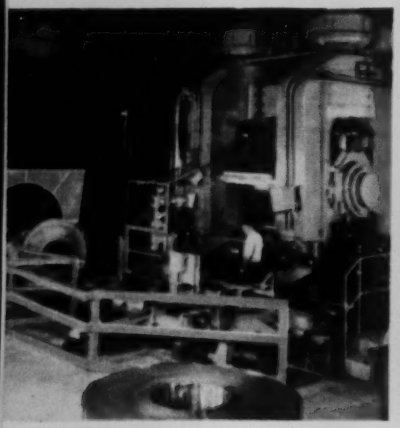
Twenty-five new annealing furnaces



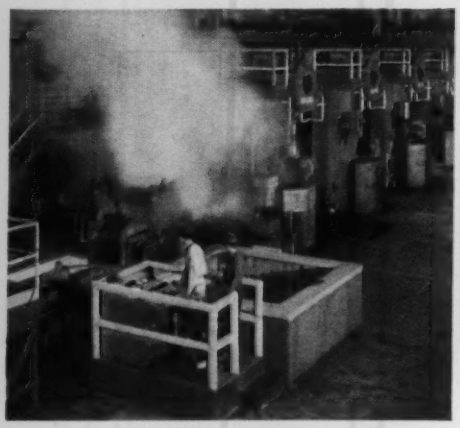
New high-capacity cold shear line



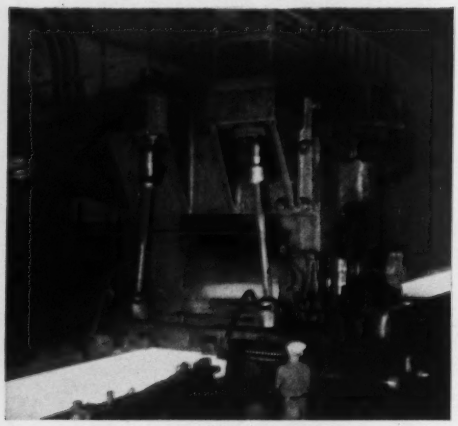
New ⅜-inch high-speed hot shear line



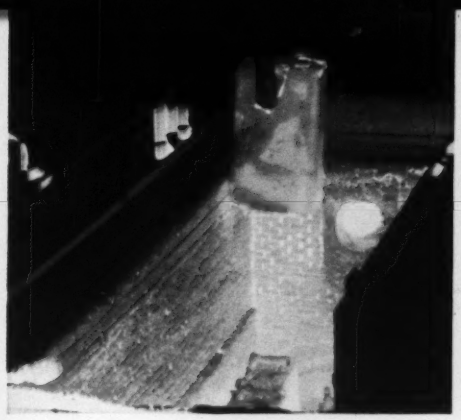
New 56-inch precision temper mill



New $36 million, 44-inch hot strip mill



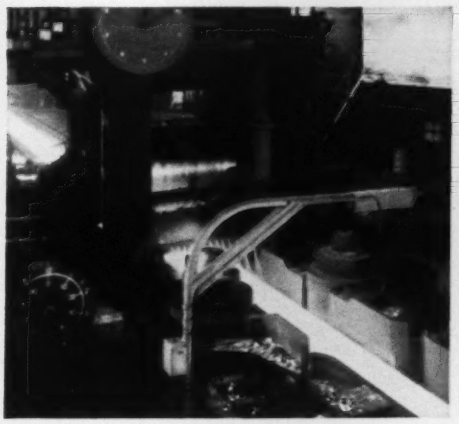
Improved 96-inch hot strip mill



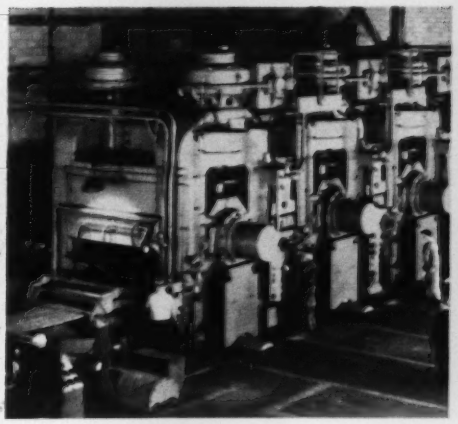
New ingot re-heating furnaces in all steel plants

New $17 million, 68-inch blooming mill

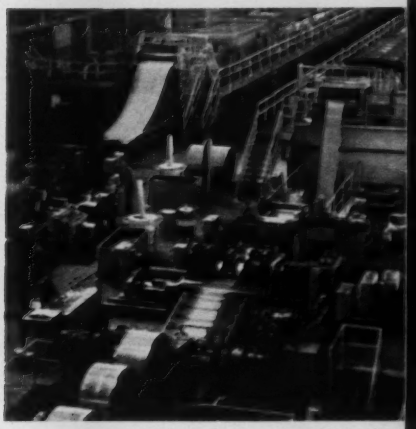
New automatic oxygen scarfer



Vertical edgers to assure accurate coil width



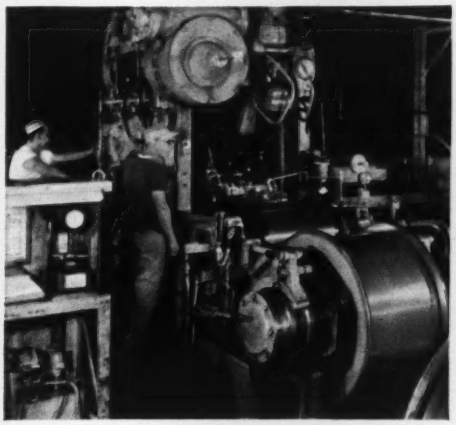
World's fastest cold reducing mill of its kind



New pickling line handles 60,000-lb. coils

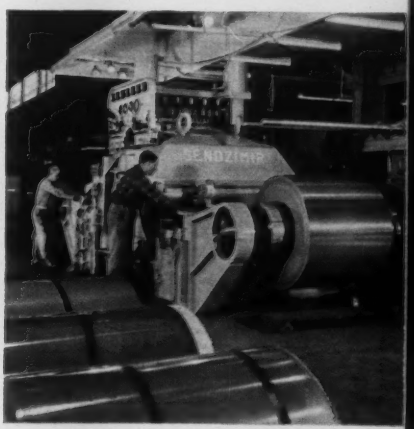
There is a new J&L, which has invested nearly 800 million dollars in new and improved facilities . . . more than twice the company's total value at the end of World War II. This gives us greatly-expanded production capacity, and enables us to be a steady, dependable source of supply for carbon and stainless sheet and strip, and many other products, to present customers and customers we never served before.

Jones & Laughlin Steel Corporation
PITTSBURGH, PENNSYLVANIA

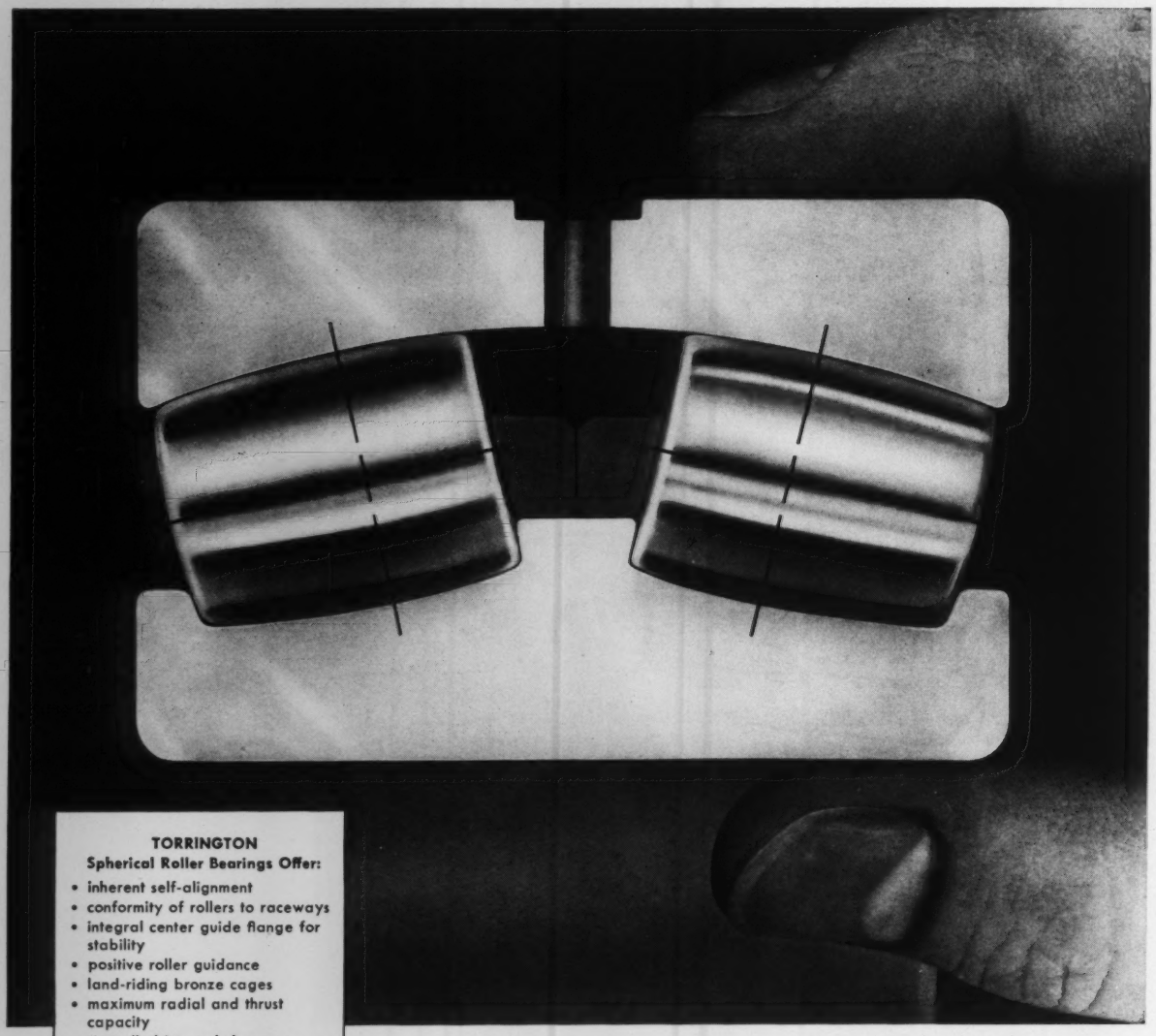


Strip steel, a new product for J&L

New $6¼ million Sendzimir galvanizing line

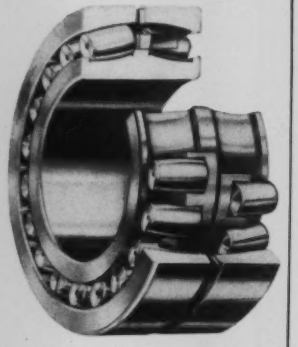


New $62 million stainless steel facilities



TORRINGTON
Spherical Roller Bearings Offer:

- inherent self-alignment
- conformity of rollers to raceways
- integral center guide flange for stability
- positive roller guidance
- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
- electronically selected rollers
- even load distribution
- long, dependable service life



Send for new Torrington Spherical Roller Bearing Catalog #258.

Shaped for Stability!

The asymmetrical shape of each roller in Torrington Spherical Roller Bearings contributes directly to operating stability and long service life.

The maximum roller diameter is not at the center of the roller. Located towards the center flange, it insures geometric positioning of the roller for positive guidance with free rolling action.

The roller shape also approaches that of a tapered roller. Lines extended from the roller-to-race contact zone converge at the roller and bearing axes. This approach to true conical rolling action further assures stability.

These are two more reasons why Torrington Spherical Roller Bearings operate cooler, quieter and with greater stability. For the ultimate in bearing performance and service life, always specify *Torrington* Spherical Roller Bearings. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

TORRINGTON BEARINGS

Every Basic Type of Anti-friction Bearing

SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST

Dr. H. T. Clark, appointed administrative director, Research and Development Dept., Jones & Laughlin Steel Corp.

Barnes Drill Co.—**Roger Marriott,** elected president and general manager; **H. A. Johnson,** named executive vice president, and **Charles Birks,** elected secretary-treasurer.

Northern Malleable Iron Co.—**R. D. Clark,** named president; **G. T. Boli,** becomes chairman of the board.

J. I. Case Co.—**W. J. Grede,** elected president.

Quebec Cartier Mining Co.—**L. J. Patterson,** appointed vice president, operations.

Worthington Corp. — **A. W. Fraser,** elected vice president and general sales manager.

Northwestern Electric Co.—**W. J. Smith,** elected vice president, manufacturing.

The Waterbury Farrel Foundry & Machine Co.—**A. S. Nippes,** appointed a vice president.

Reynolds Metals Co.—**R. M. Kibby,** promoted to manager, reduction research.

Republic Steel Corp.—**C. A. Anderson,** named superintendent, Blast Furnace Dept., Youngstown plant.

Union Carbide Metals Co.—**O. M. Miller,** named manager, primary marketing research.

Wheeling Steel Corp.—**N. W. Hocking, Jr.,** appointed superintendent, maintenance, Steubenville Works.

Alan Wood Steel Co.—**L. R. Laux,** named general superintendent, maintenance.

Trent Tube Co.—**F. W. Beitner,** appointed general sales manager, East Troy, Wis.; **F. G. Higbee,** appointed district sales manager, Northeastern United States.

U. S. Steel Corp., Columbia-Geneva Steel Div.—**C. C. Morgan,** appointed general manager, operations, San Francisco.

R. C. Stillman, appointed asst. to the president, The Torrington Mfg. Co., Torrington, Conn.

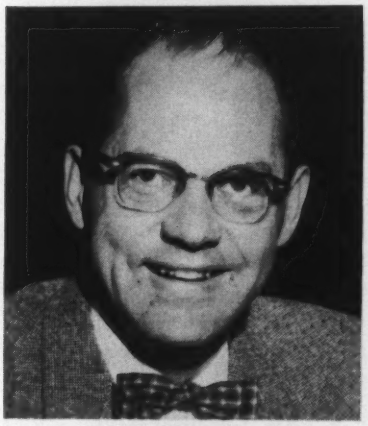
Olin Mathieson Chemical Corp. —**F. E. Plumley,** named director, purchasing, Purchasing Dept.; **J. J. Forst,** named metals specialist.

Wales-Strippit, Inc.—**D. S. Flint,** appointed mid-western tool and methods engineer.

Aluminum Co. of America, Commercial Research Div.—**R. W. Davis,** appointed chief analyst.

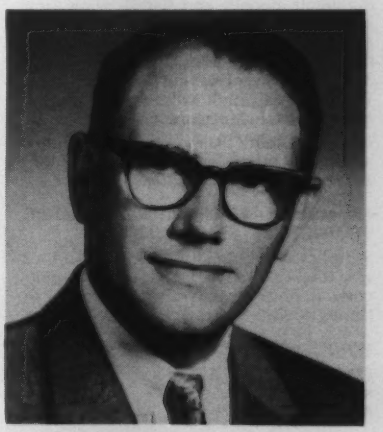
Weston Instruments Div., Daystrom, Inc.—**Emil Nichols,** named

(Continued on P. 98)



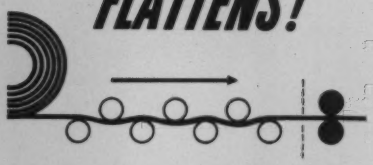
J. G. White, appointed general manager, sales, Pacific Coast Div., Bethlehem Steel Co.

T. Z. Hayward, appointed senior vice president, Joseph T. Ryerson & Son, Inc.

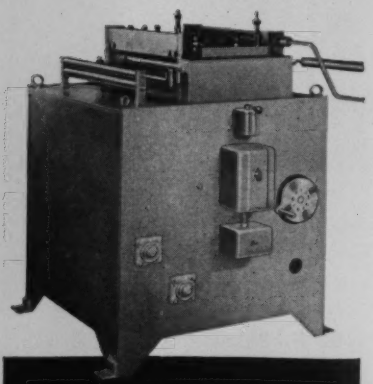


W. E. Falberg, appointed vice president, sales, Joseph T. Ryerson & Son, Inc.

LEVELS FLATTENS!



reduces CURL, CAMBER, etc!



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STRAIGHTENING MACHINES
make all Feeding Easier,
Improve Accuracy!

For making better parts easier put your stock through this advanced Benchmaster straightening machine! 9 adjustable powered rolls take the kinks out of stock—deliver it smooth and flat to your press, shear or other machine. Equipped with an actuator bar which supplies stock intermittently, as needed. Also available with Variable Drive Unit for 20 to 120 fpm. Feeds with pinch rolls at exit end or entrance end. Motor reversible.

Here's a quality Straightening Machine at a sensible price! Sizes for many requirements to 50" stock widths.

Also available—BENCHMASTER COMBINATION STRAIGHTENING—FEEDING MACHINES

Supplies straightened stock at an adjustable feed rate. Straightener includes pinch rolls driven by variable speed motor through magnetic clutch.

WRITE FOR DESCRIPTIVE FOLDERS!

Describe stock and operation for personal recommendations.

benchmaster

World's largest manufacturer of small punch presses and mills.

1835 West Rosecrans Ave. • Gardena, Calif.

(Continued from P. 97)

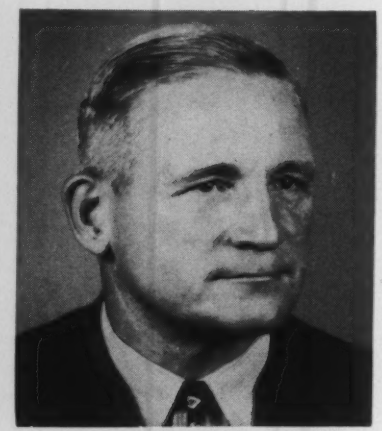
commercial market manager; **R. E. Love,** industrial market manager, and **R. S. Lehman,** military market manager.

R. P. Snyder, appointed manager, purchasing and engineering, Harbison-Walker Refractories Co.

Bethlehem Steel Co.—**H. K. Wilson,** appointed asst. general manager, Lackawanna Plant.

Reynolds Metals Co.—**A. J. Sutherland, Jr.,** promoted to asst. director, purchases; **L. W. Norfleet,** promoted to asst. general purchasing agent.

U. S. Steel Corp., National Tube Div. — **John Schmidt,** appointed chief project engineer, Construction Engineering Dept., Lorain, O., works.



W. J. Buechling, appointed general superintendent, Aristoloy Steel Div., Copperweld Steel Co., Warren, O.

H. C. Lingle, elected vice president, engineering and production, Paslode Co., Chicago., Div. of Signode Steel Strapping Co.

U. S. Steel Corp., National Tube Div.—**J. F. Byrne,** appointed asst. director, purchases.

Jones & Laughlin Steel Corp.—**—Dr. E. R. Morgan,** appointed director, research.

Koppers Co., Inc., Engineering and Construction Div. — **R. C. Diehl,** named vice president.

Leonard Larson, named chief engineer, flat rolled products, Republic Steel Corp.

International Business Machines Corp.—**W. J. Lawless, Jr.,** appointed director, system and application engineering.

Hooker Chemical Corp., Durez Plastics Div.—**J. F. Ortner,** promoted to product manager, molding

(Continued on P. 102)

250,000 Power Tools per year with Cities Service Pacemaker T

Porter-Cable, one of the world's largest manufacturers of portable wood-working tools, has long known the value of quality in a lubricant as well as in a power tool. Each piece of equipment made by Porter-Cable is carefully pretested before manufacture and then continually tested for years after its original appearance on the market. It is this kind of thoroughness that led to Porter-Cable's choice of Cities Service Pacemaker 300 T as the hydraulic oil to power their Fostermatic Screw Machines and Landis Grinders.

But Cities Service Pacemaker T is more than a hydraulic oil . . . it is a multi-purpose line of lubricants suited for many applications. Porter-Cable also uses Pacemaker 300 T for lubricating valves in the plant's compressors. Pacemaker T can be used to lubricate bearings, diesel engines, electric motors, generators, reduction gear drives, turbines and in circulating systems.

Pacemaker T is available in various viscosities to give you one line of quality lubricants that can save costly warehouse space by simplifying your inventory . . . cut maintenance costs and extend equipment life. These oils have high viscosity index, excellent heat resistant properties and are chemically fortified against oxidation, corrosion, rust formation and foaming.

Contact your nearest Cities Service office and an experienced Lubrication Engineer will call to make specific recommendations for your plant on the use of Pacemaker T. Or for further information, write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Porter-Cable Machine Company
Syracuse, New York

Porter-Cable Research Engineer testing engine for new lawnmower the company will produce soon. All new products undergo extensive research and testing before production.

Backbone of Production Line is Automatic Screw Machine. Pacemaker T gives outstanding performance as hydraulic medium in these machines as well as in Landis grinders and as a general lubricant!

"Now, thanks to Columbia-Southern's recommendations, our Trichlor degreasing operation removes stubborn soldering flux, and we have reduced our maintenance costs"

reports Thomas F. McDonough,
Superintendent,
American Meter Company, Inc.,
Philadelphia

Thomas McDonough (right), Superintendent of the American Meter Philadelphia plant, discusses improved degreasing results with Edward Losben, of Globe Solvents.

"We run a fast degreasing cycle, passing soldered gas meters through an electrostatic painting system. So even brief stops caused by faulty degreasing cost us real money. That's why we are so pleased with Columbia-Southern's assistance."

Mr. McDonough speaks with authority. American Meter's Philadelphia plant turns out a giant's share of the nation's gas meters. Every work station in the complicated assembly operation is carefully engineered for efficient production. And frequent inspection stops along the way insure leak-proof meters that give years and years of accurate gas measurement.

This precision and concern for quality is evident in the degreasing set-up, too. American Meter degreases and paints fully assembled gas meters in a continuous, integrated operation. Meter housings consist of two metal shells soldered together. Painting is done electrostatically, to provide an even coat rapidly. Before painting, the meters pass through a large-capacity vapor degreasing machine, with Trichlor used as a solvent. This action removes excess soldering flux—an acid-type material that makes paint peel. The Trichlor treatment also removes grease and soil picked up during handling. End result is a perfectly clean surface that takes—and holds—an even coat of paint. And since some American Meter units are used outdoors, in all types of climates, the paint job must have a long life.

American Meter *has* to get excellent degreasing results. With their fast-moving production cycle, poor handling for even the briefest period of time would lead to a costly number of rejects. Also, because they paint electrostatically, the painting surface must be completely free of all foreign matter, to take the coating ejected during the rapid pass through the paint machine.

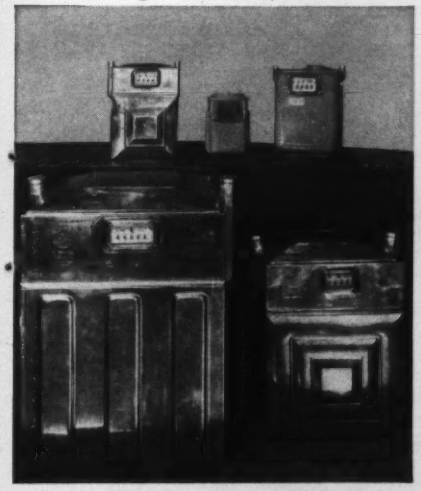
To get the most efficient vapor degreasing possible, American Meter called on Columbia-Southern's Technical Service Department. A Columbia-Southern Technical Service Engineer, working with the Columbia-Southern distributor, Globe Solvents Company, Inc., of Philadelphia, inspected the operation and recommended a more careful maintenance program. They found that American Meter had been running solvent with too high an acid concentration from removed flux. This harsh solution harmed the lining of the degreasing machine itself, and pitted the gas meter housings.

By following Columbia-Southern's advice, American Meter was able to determine the ideal stopping point for cleaning, before passing harmful solvent back into the cycle. This has eliminated the trouble, and American Meter now gets a cleaner meter for painting, and spends less time and cost on degreasing maintenance.

This help from Columbia-Southern's Technical Service Department, combined with excellent service given by Globe Solvents, explains why American Meter is sold on Columbia-Southern Trichlor.

You'll like doing business with Columbia-Southern

American Meter produces gas meters for every need—from small private homes to large hotels and apartment houses.



Harvey Plowfield (in dark suit), American Meter's Standards Engineer, inspects newly soldered gas meter housing at one of plant's assembly lines.

American Meter degreases up to 1,200 completely assembled meters in an 8-hour shift—a fast cycle that demands top quality results.

columbia | southern chemicals

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
A Subsidiary of Pittsburgh Plate Glass Company
One Gateway Center, Pittsburgh 22, Pennsylvania

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland
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Dallas • Houston • Pittsburgh • Philadelphia • San Francisco
IN CANADA: Standard Chemical Limited

YOU CAN'T FIND A MORE DEPENDABLE DEAL THAN B&O BITUMINOUS COALS FOR EVERY PURPOSE!

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BALTIMORE & OHIO RAILROAD
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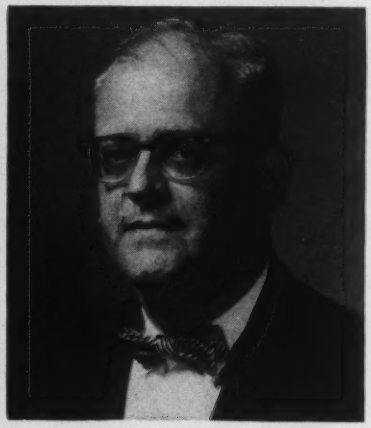
(Continued from P. 98)

compounds, Sales Dept., North Tonawanda, N. Y.

H. A. Richards, appointed manager, raw materials, Weirton Steel Co., Div. of National Steel Corp.



H. L. Kittel, promoted to supervising industrial engineer, Armco Steel Corp., Middletown, O.

National Can Corp., Central Div. —**J. W. Haslett,** named manager, production planning.

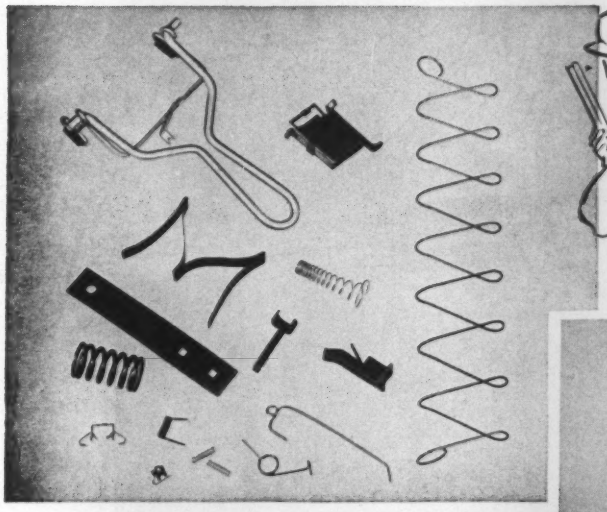
The DeVilbiss Co. — **D. L. Bohon,** appointed manager, industrial sales.

H. K. Porter Co., Inc., Delta-Star Electric Div.—**J. F. Zboyovsky,** appointed manager, Thomas Works.

The Torrington Mfg. Co., Air Impeller Div.—**M. B. Hunting** and **I. J. Roy,** appointed field sales representatives, Chicago office.

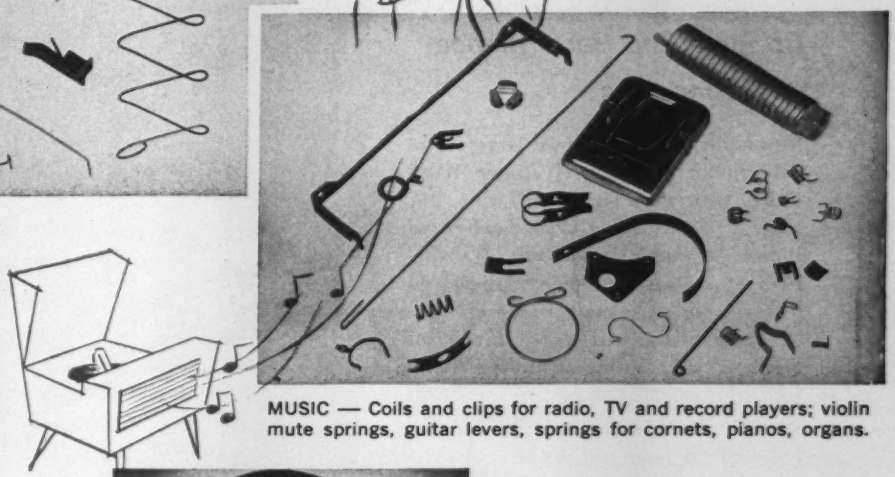
From Hunting to Hi-Fi . . .

There's a Spring in your Hobby

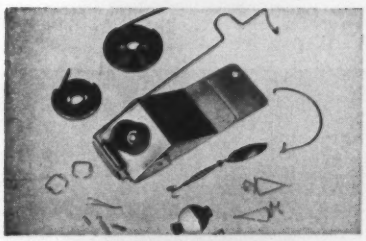


HUNTING — Ammunition clips, trigger springs and gun parts for civilian and military use; even a precision sling shot frame.

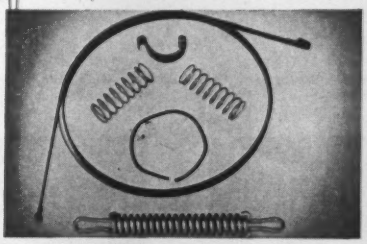
The booming market of hobbies and sports is typical of the far-reaching use of A.S.C. products. Often small but always important, springs make better products possible — and A.S.C. Divisions make better springs through constant research and experiment. Write for "The Picture Book of Springs."



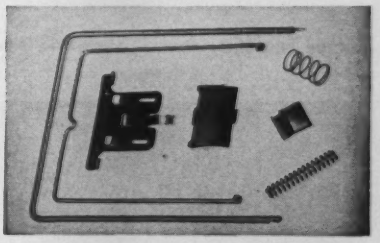
MUSIC — Coils and clips for radio, TV and record players; violin mute springs, guitar levers, springs for cornets, pianos, organs.



FISHING — power springs for reels; wire and flat springs for rod holders, lures; and a frog holder frame.



BOATING — starter springs and parts for outboard motors; shock-absorber spring for trailers; rope tightener spring.



PHOTOGRAPHY — view finder frames, shutter springs and stampings for movie and still cameras.

Associated Spring Corporation

General Offices: Bristol, Connecticut

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
B-G-R Division, Plymouth and Ann Arbor, Mich.
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Raymond Manufacturing Division, Corry, Penna.
Ohio Division, Dayton, Ohio
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Milwaukee Division, Milwaukee, Wis.
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.
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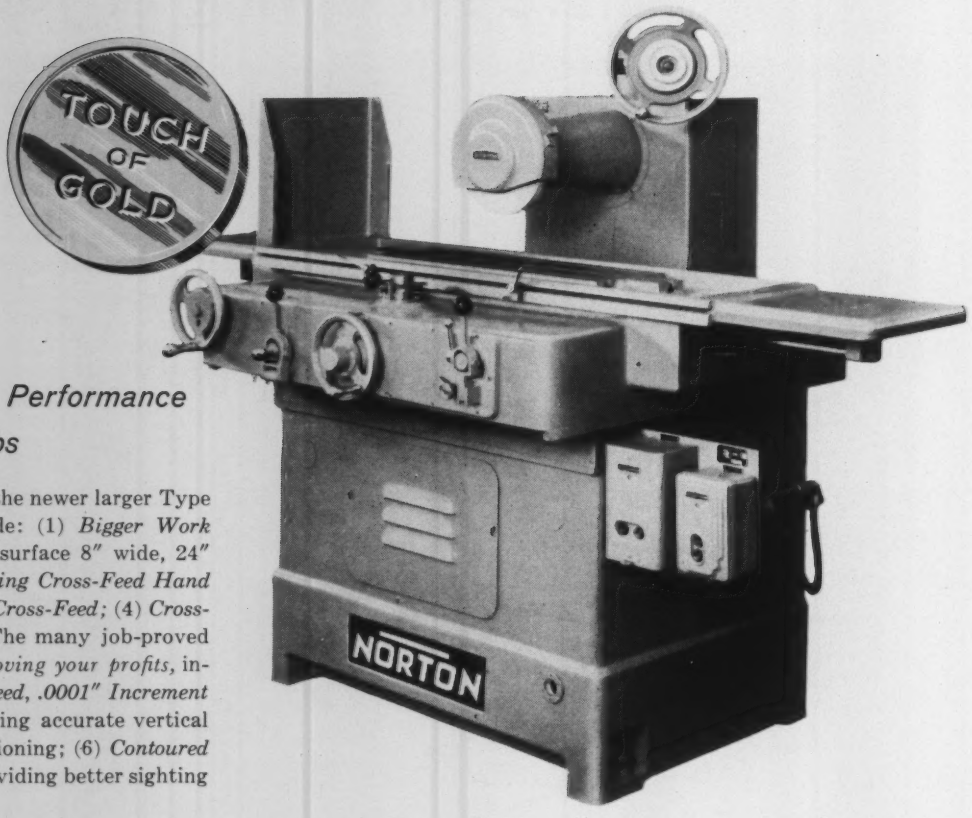
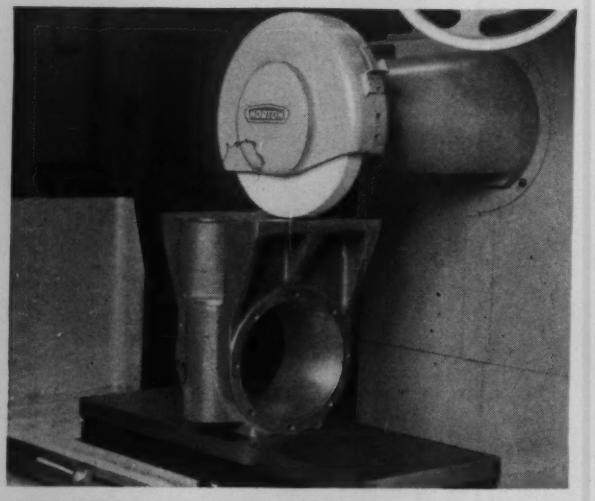
A big success...so...



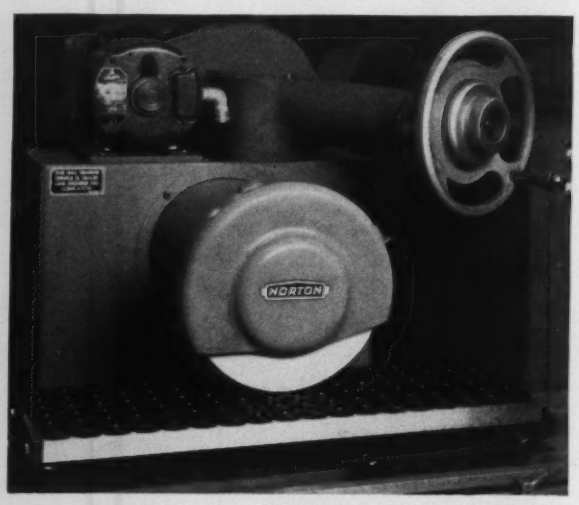
Bringing Top Performance to Larger Jobs

New additions to the newer larger Type S-3 grinder include: (1) *Bigger Work Table,* with work surface 8″ wide, 24″ long; (2) *Interlocking Cross-Feed Hand Wheel;* (3) *Power Cross-Feed;* (4) *Cross-Feed Stop Dogs.* The many job-proved features, *for improving your profits,* include: (5) *Two-Speed, .0001″ Increment Hand Wheel* assuring accurate vertical feed and fast positioning; (6) *Contoured Splash Guards* providing better sighting and loading.

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



High-Grind Wheel Head Construction, provides 13¾″ vertical capacity from table top to bottom of standard 10″ diameter grinding wheel, for handling tall workpieces.



125 Feet Per Minute is the Type S-3's high table speed that enables you to produce smoother plane surfaces, cut grinding time and increase production rate.

we're building it bigger!

Norton Type S-3 surface grinder... with proved ability to finish flat faster... Now available in 8" x 24" size

Performance of the new Norton 6" x 18" Type S-3 surface grinder for customers like these . . . Addressograph-Multigraph Corporation, Clevite Corporation, Cleveland Graphite Bronze Division, National Cash Register Company, The Timken Roller Bearing Company, Warner & Swasey Company . . . has made this larger size a necessity.

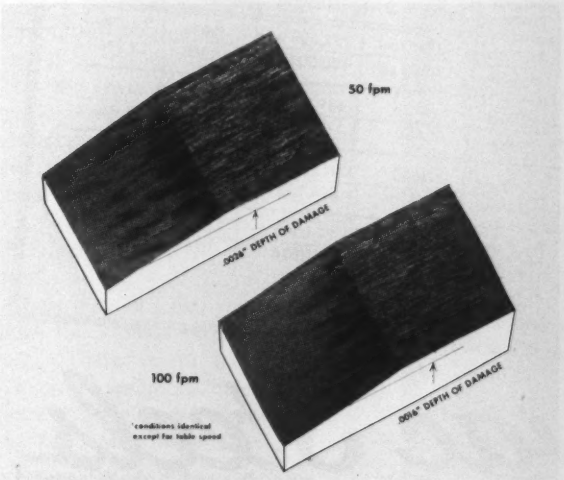
Besides a longer and wider work table, other design advancements enable this top-ranking surface grinder to finish bigger workpieces smoother, faster, at lower cost. Get the whole story from your Norton Sales Engineer, a trained specialist who can help you get better grinds for less money, or ask for our catalog 1982. NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

NORTON

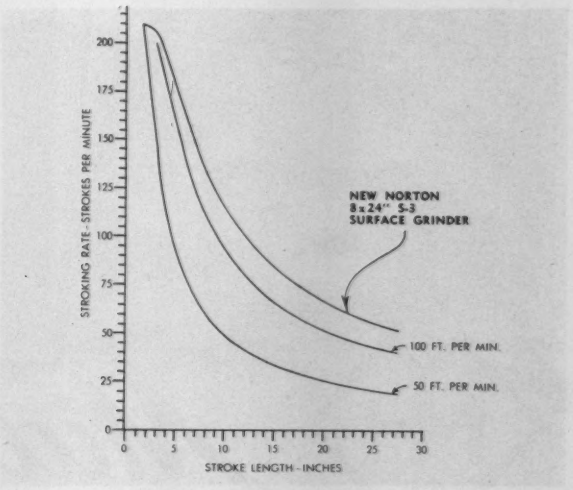
MACHINE TOOLS

75 years of... **Making better products ...to make your products better**

MACHINE TOOL DIVISION: Grinding and Lapping Machines — **G & E DIVISION:** Shapers • Gear Cutting Machines • Gear Induction Hardeners



Better Quality Work due to less heat damage with faster table speeds . . . at the same time greatly increasing the rate of stock removal.



Calculate Your Savings from this Production Rate Chart. Grinding time is reduced in proportion to the increase in stroking rate.

WHERE INCREASED TENSILE, IMPACT AND TEMPERATURES COUNT... MORE ENGINEERS COUNT ON

MIDVAC STEELS

Where maximum reliability and minimum rejects, due to failure to meet mechanical properties, must be attained... more and more engineers are specifying Midvac super alloy steels.

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The table below shows just a few of the many super alloys being processed by Midvac. Our metallurgical engineers are ready to help you select or specify the Midvac Steel to meet your requirements. Write for complete technical data.

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Plants: Pittsburgh, Pa. • Bridgeport, Conn. • New Brighton, Pa.

Alloy	Melting Process	Yield Strength .2	Ultimate Tensile Strength	Percent Elongation	Percent Reduction of Area
A-286	Air Melt	99,000 psi.	132,300 psi.	9.0%	14.7%
	Midvac	117,000 psi.	150,500 psi.	21.3%	33.8%
Gannalloy	Air Melt	112,000	159,900	13.0%	21.0%
	Midvac	142,600	177,250	18.0%	31.6%
D6A-C	Air Melt	234,800	281,000	4.9%	20.6%
	Midvac	256,700	294,250	9.6%	28.4%
Tricent	Air Melt	238,600	284,500	6.1%	19.7%
	Midvac	254,300	291,600	10.3%	25.6%

Properties shown are averages of 25 heats

MH *Midvac Steels*

What Is Management's Role In Numerical Controls?

Numerically - controlled machine tools are coming more into vogue. Management plays a big role in furthering their use.

What is needed is compromise between two groups: Designers and production people. When this is done, then the ideal tool goes into action.

▪ A successful numerically - controlled machine tool is largely up to management. Its responsibility includes acquisition, performance and service. It takes a proper blend of the six basic elements of numerical controls to make any system run smoothly.

These points were stressed by Mark Morgan, Senior Engineer, International Business Machines Corp., Poughkeepsie, N. Y., at a recent seminar on numerical controls before the American Management Assn.

Data processing equipment and computing are two of the key elements, according to Mr. Morgan. You should also include any electronic devices associated with the machine tool, though not physically tied to it. Another element is instrumentation, be it digital or analog, installed on the machine tool. Of course, there's the machine tool itself.

Last but not least, you must consider the various phases of operation. These relate to production lot sizes, economical ordering quantities, tooling and personnel training, to mention a few.

Times Have Changed — In the earlier days of numerical controls, electronic equipment, the machine tool with its instrumentation and data processing were purchased as separate items of equipment. But progress has been made. Now only data processing equipment is treated separately.

The end user of a numerically-controlled machine tool looks at it through the eyes of its production team. The manufacturer of the controls, on the other hand, must rely heavily on the judgment of its own design engineers.

IBM not only makes computers which can be used in numerical controls, it also uses them in its own operations. This company uses numerical controls in machine tools as well as in electronic assembly operations.

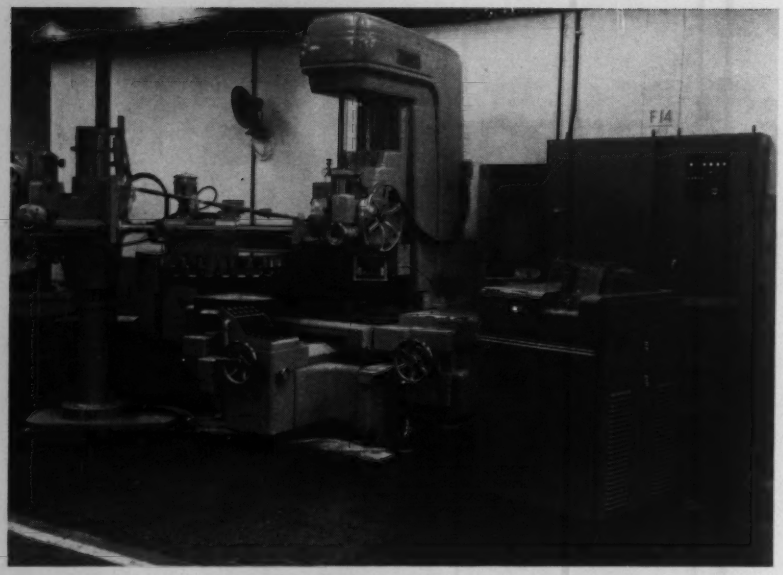
One or the Other — Numerical controls can be divided into two systems: Positioning and contouring. As far as data processing and computing are concerned, they become far more complex in contouring systems.

To see how complex computing can be, look at a part to be machined. Such a part is either depicted by drawings or drawings combined with mathematically-defined outlines.

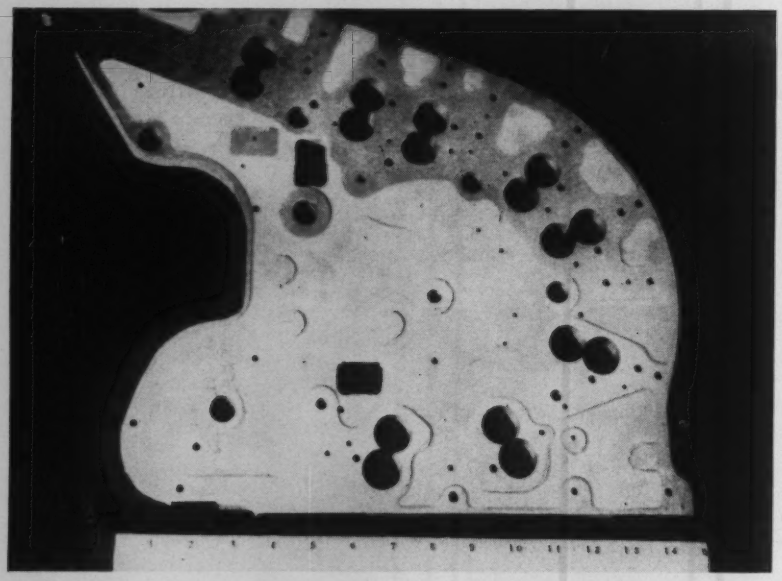
A manuscript is then made from these data. With IBM equipment, it must be in a certain form, suitable for key punching into cards. These cards become the input to the computer. The computer's output is a coded program which contains the instructions for the machine tool.

Progress has also been made in

TRANSLATION BEGINS: Manuscripts prepared from drawings are key punched into cards. Some conventional systems require tapes.



PROGRAMMED BORING: Card-controlled boring machine has been in successful operation for two years at IBM's Endicott plant.



FASTER SET-UP TIME: More set-up time is required to produce parts in conventional systems. The ratio favors numerical controls.

easing the language barrier between people and machines. Work in this area was spearheaded by MIT's Servo Mechanisms Laboratory. Further work along these same lines is being done by IBM and other groups.

3-D Memory—MIT started with a system called APT (Automatically Programmed Tool). Since then, IBM has refined this scheme into a more flexible system known as Auto-Promt. This system describes three-dimensional shapes and organizes machine instructions to produce such shapes.

In effect, it eases the job of the tool designer and the programmer. Spatial lines from intersecting surfaces are automatically recognized. There's no need for the designer or programmer to define in detail.

In this system input language is understood not only by the computer but by the engineer. The language used to describe a spherical surface, for instance, might be: "SPHERE IN/CTR (X, Y, Z) DIA (d)."

Language Aids—Feed rates and other machine tool functions—coolant on or off, for example, can also be recorded in Auto-Promt language. Coded data are then translated from the cards onto paper tape, the input medium to the machine tool control system.

Missing from present tape code systems has been a certain amount of logic and uniformity. To ease this problem, IBM has developed special purpose translators.

At first, these translators were designed on a custom basis. A new translator is more universal in nature. This unit can translate from and card code to any tape code, by control board changes.

The Right Machine — Take the case of IBM's card-controlled boring machine. Choice of machine is always a problem. It will either have to be a new or an existing machine. Production people are more interested in a machine's output. Very often, this interest conflicts with engineering requirements.

The ideal location of numerically-controlled instrumentation is at the workpiece itself. Of course, this is not practical. But it still makes sense to compromise and place the instrumentation as close to the workpiece as possible.

Why? To eliminate operational errors in backlash, elasticity of drive members, static friction and uneven wear. The problems don't end here. Control engineers would rather use a high-performance servo drive.

Point of View — Production people, on the other hand, think in terms of massive tables, high friction sliding ways and high rigidity members. Experience tells them to

depend solely on the machine tool and its alignment for accuracy. Compromises are in order here, too.

The production man is used to a tool that is easy to load or unload —one that is easy to control by hand. He is not too impressed by the ability of a machine to accelerate or decelerate through variable feed rates. As a result, the machine selected for numerical controls is one that has already performed successfully in the shop.

The ideal system would include uniform machine codes wherein readers could read magnetic tapes produced directly by the computer. Also, machine tool controllers would be so designed to accept numerical instructions on magnetic tape. This would only be possible if all elements (computer, control and tool) resided in a single agent.

Final Choice—At IBM, all of these points were weighed before deciding on the type of machine to use. The machine was finally selected. It was a new machine that would lend itself to controls by pulse techniques.

The boring machine in IBM's Endicott plant runs from a program stored on cards. Punch paper tape is much more common. But, as an input to a point-to-point system, cards offer noted advantages.

Suppose a hole to be bored must be changed. It's much simpler to bring one card up to date than to change an entire tape. It could easily happen that a certain spindle speed did not produce the desired surface finish. By using a hand punch the machine operator could repunch the card in question, put it back in the deck, bypassing the tool design group.

How They Compare—As far as output is concerned, IBM can furnish interesting statistics. Its boring machine has been in operation for more than two years. Numerical controls hold a wide edge over conventional methods.

Typical parts machined by both techniques favor numerical controls in boring times by a ratio of three to two. And set-up times favor numerical controls by a ratio of seven to one.

Positional accuracy in a typical part run is equal to ± 0.0002 in., while depth accuracy equals ± 0.002 in.

Less Delays—Programming averages about two hours per part. Keypunching takes 15 to 20 minutes per part. There's a saving during production runs from numerical controls. The reason? There are no delays from the nonproductive steps (spindle retract, tool changing and table indexing).

It's safe to say that the fewer holes to be bored per part, the higher the savings. The same is true when fewer parts of one type are used. These statistics and conclusions are drawn from the results obtained over a two-year period with the Endicott machine. This machine, in fact, is now running 16 hours per day.

Recent models of manually-set machines have been developed that entail easier and faster table settings. It's only fair to note that these newer units would probably reduce the seven-to-one ratio in set-up time savings to some degree.

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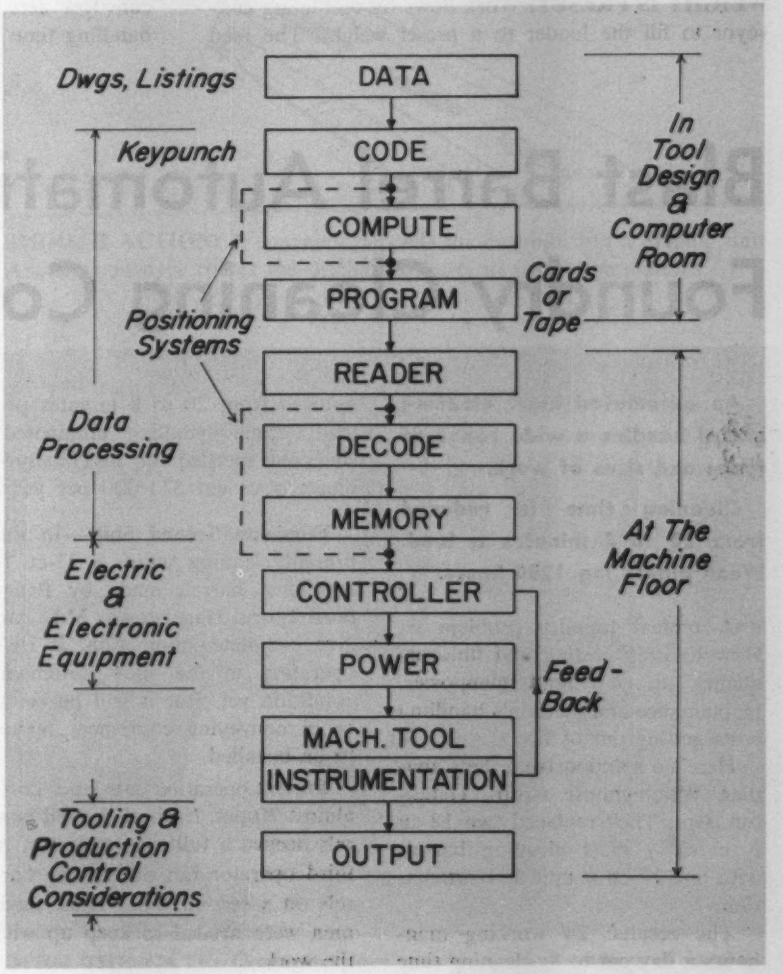
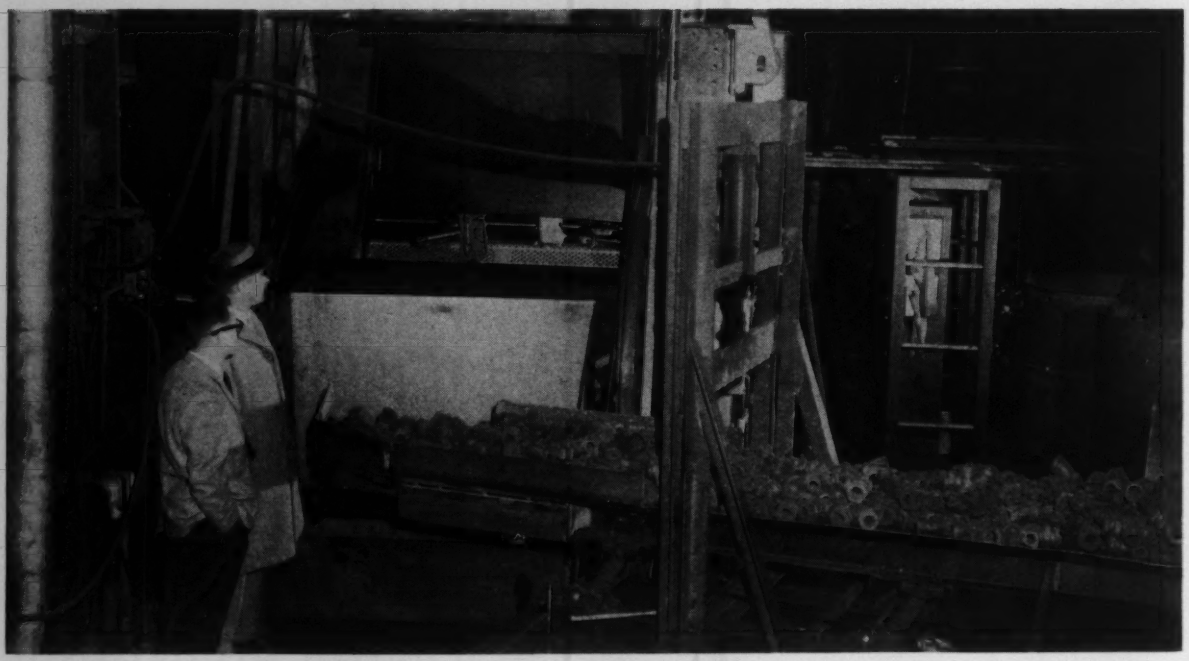
Numerical Control Breakdown





WEIGHT IS PRESET: Work flows by oscillating conveyor to fill the loader to a preset weight. The feed conveyor acts as a shakeout for the castings. Crane handling time has been completely eliminated.

Blast Barrel Automation Cuts Foundry Cleaning Costs

An automated blast cleaning barrel handles a wide range of types and sizes of work.

Cleaning time is reduced from 20 to 8 minutes a load. Wear plates log 1200 hours.

▪ A typical foundry problem is: How to keep casting and finishing quality up — without manpower, maintenance and materials handling costs getting out of line.

Here's a solution from the Canadian Westinghouse Corp., Hamilton, Ont. They replaced two 18-cu ft capacity blast cleaning barrels with one 27-cu ft unit and automation.

The results: 24 working manhours a day cut to 8; cleaning time reduced from 20 to 8 minutes per load; crane handling eliminated; shakeout speeded up; and maintenance costs cut $11,000 per year.

Eliminate Second Shift—In the present cleaning setup, a 27-cu ft Rotoblast barrel, made by Pangborn Corp., Hagerstown, Md., can give complete automation. It isn't operating in the fully automatic condition yet. But it will be soon. More conveying equipment is yet to be installed.

Present operation cuts labor costs almost 70 pct. Each of the old barrels needed a full time operator. A third operator ran one of the barrels on a second shift. Thus, three men were needed to keep up with the work.

With the new machine, the second shift isn't needed. A single operator handles the workload. This frees two men for other foundry work. When full automation takes place, all operating labor will be eliminated.

Weekday Maintenance—Besides saving manhours, the new system provides better materials handling. Previously, castings were placed on a shakeout device; then put in boxes. A crane carried the boxes to the two blast barrels. It dumped the castings onto an oscillating conveyor. The conveyor fed a loading skip.

The new system handles castings rapidly. This allows all maintenance work to take place during the regu-

lar working week. Elimination of weekend work cuts annual maintenance costs. Accurate records show a saving of $11,000 a year.

Wheel vanes on the new blast equipment last over 200 actual blast-hours.

High Wear Resistance—The new barrel has a lining of wear resistant plates. High initial cost discouraged making this investment for some time. But, it was finally decided to do so. Results have been outstanding. Now, the company will have nothing else.

Present wear plates have logged more than 1200 hours of blast time. And they show no signs of wear. In fact, their original tool marks haven't worn off.

By contrast, the previous wear plates last 200 hours at best. Then replacement is required. This involves down-time and maintenance labor. The cost of replacement plates is high.

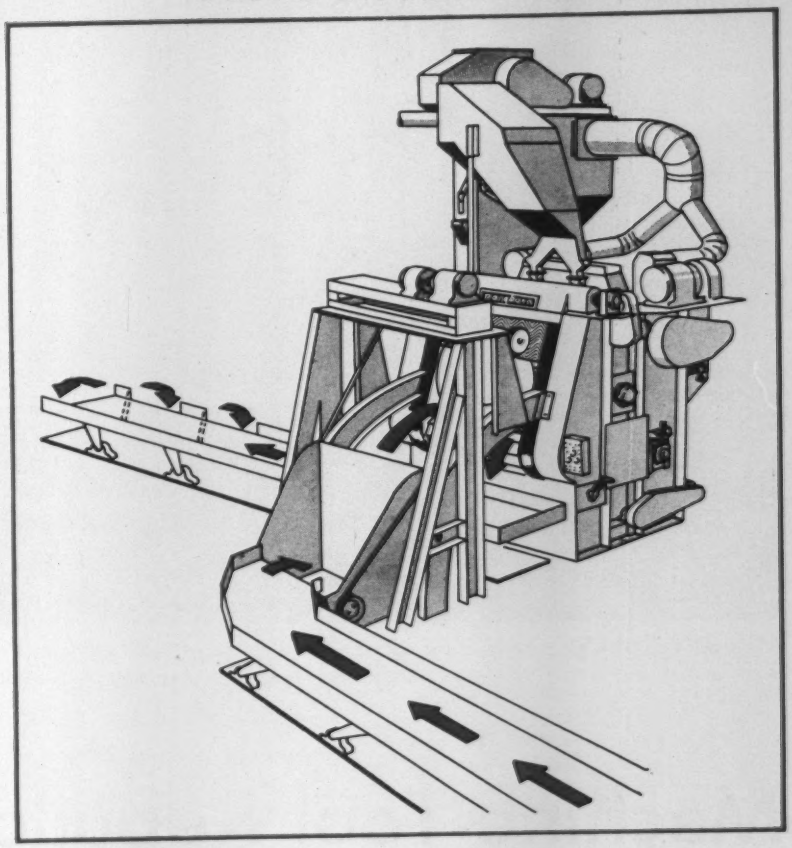
No Crane Handling — Cleaning time was 20 minutes per load. It's been cut about 70 pct with the new high horsepower blast cleaner. Loads now average 2000-3000 lb. This is more than either of the 18-cu ft barrels could handle.

The speed-up is significant. Normal foundry production at the Hamilton plant is 800,000 lb of castings per month. About ⅔ of which, or 280 tons, go through the blast cleaning barrel. The new barrel cleans everything in sizes up to air brake reservoirs, about 2 ft square.

Manpower and maintenance savings, while impressive, do not tell the full story. Crane handling time has been eliminated. Shakeout has speeded up. Now, the feed conveyor acts as a secondary shakeout for the castings. It operates effectively in this regard.

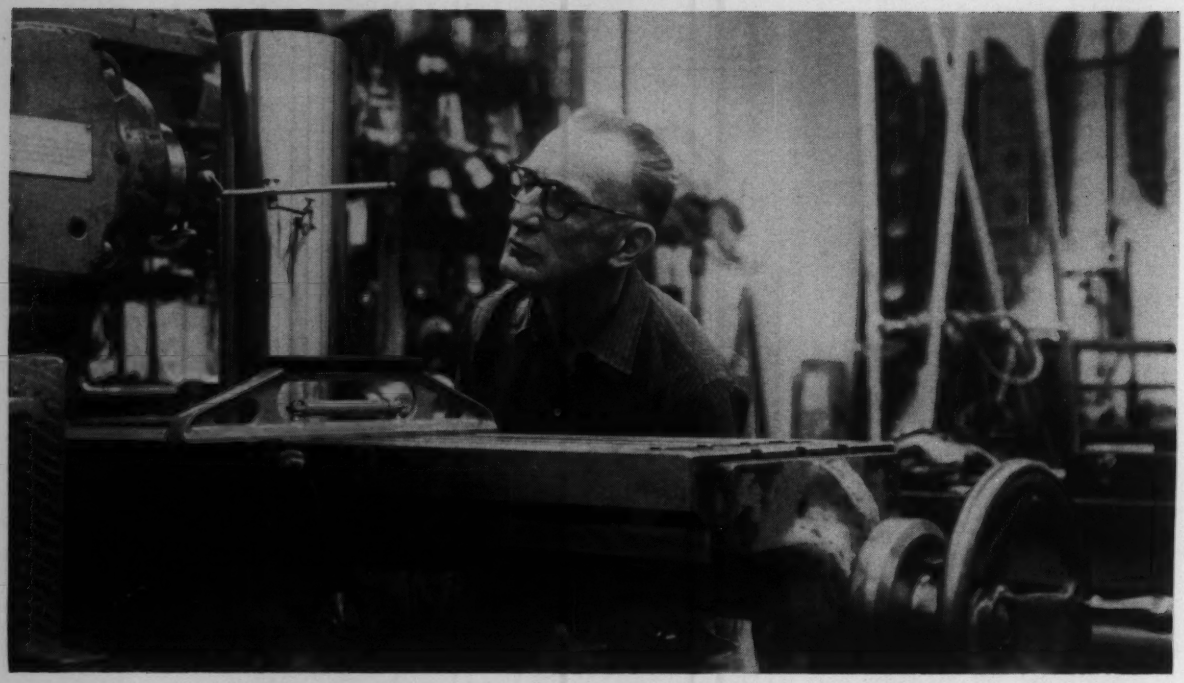
Additional savings result from a careful study of blast cleaning adhesives. Canadian Westinghouse uses a premium quality blast cleaning shot in the S-390 size.

Here's How Work Flows



SMOOTH ACTION: A conveyor deposits the castings into a loading unit. Another conveyor routes the discharged parts to inspection stations.

OPEN THE GATE: Conveyor gates provide station routing of castings.



RUN-OUT CHECK: A cylindrical square and a level indicate the amount of run-out present between the bed and chuck of a lathe. Each division on the precision level equals a reading of 0.00025 in. per foot.

Machine-Tool Rebuilding Offers A Challenge to Industry

Proper installation is the starting point in obtaining optimum machine performance.

Even new machine tools may require rebuilding in order to meet tight working tolerances.

▪ At specific intervals most machine tools require reconditioning or even rebuilding. Every good machine tool provides a limited amount of normal, trouble-free use.

Proper installation offers a starting point for stretching the useful life of machinery. Preventive maintenance then carries the major load. But, reconditioning or rebuilding, by competent personnel, should not be overlooked at all stages.

Recently, the Raytheon Mfg. Co., Bedford, Mass., purchased a cylindrical grinder for a specific purpose. During installation, a routine inspection disclosed that the ways and bed of the new unit were not properly aligned.

Rebuild New Machine — Since the grinder's function is machining of pistons for costly rocket valves, perfect alignment is a must. Tolerances for the rocket pistons are tight. These tolerances were too rough for the grinder, as received, to meet.

Veteran machine-tool rebuilders at Raytheon had to patiently handscrape the grinder's bed and ways. Now, the machine grinds to within 0.0001 in. And, it maintains these tolerances consistently.

During the rebuilding process, another potential source of trouble was uncovered. The tool rebuilders discovered an old fault—improper lubrication. It was apparent that trouble would develop between two critical working surfaces. Oil just wouldn't stick to the smooth metal parts.

Lubrication Pockets — By handscraping, Raytheon's tool rebuilders roughened the metal surfaces. Thousands of little hills and valleys, carefully gouged into the metal, now provide a breathing space for the lubricant. This insures longer wear. It also helps to produce more accurate work, over a longer trouble-free period of time.

In this day of specialization, it's

hard to find a good machine tool rebuilder. Very few men understand all the intricate parts of modern machine tools. One man is good on columns; another on gibs; a third knows all about table tops.

Requires Experience — Gilbert Peters, one of Raytheon's veteran tool rebuilders, emphasizes that the surface plate is where all good machine work starts. "If the surface plate isn't absolutely level," he says, "inaccuracies are bound to show up in the finished work." A surface plate error may be very small, but in precision work this small error can spell costly trouble.

The tools of an experienced machinery rebuilder include: the sensitive spinning indicator, the hand-scraper, a precision level and the leveling bar. Also required are plenty of experience and good old-fashioned human skill.

Peters recently tackled a test plate used for routine inspection work. The plate measures 36 x 48 in. and weighs several hundred pounds. Resting on angle irons, it was out 0.028 in. in flatness.

Straighten Plate — Setting the plate on a three-point bearing, Peters took 0.016 in. of the error out of the angle irons. Distortion of the angle irons had allowed the surface plate to follow the bending error. After the irons were straightened, scraping by hand removed all remaining error.

Hand scraping means, of course, the actual flaking off of fine metal chips. It requires experience and the proper feel to know exactly how much chipping to do. A novice will chew his way out of a job, if he isn't careful.

Experienced men check their work constantly. They use verniers, indicators, precision levels and other instruments as guides. Prussian blue provides visual proof of any scraping errors.

When the blue fails to show up all over the work face, a section has been missed. This means more scraping is required. But, besides being a lot of work, too much scraping can ruin the part.

SCRAPE BY HAND: Working at a milling table, a tool repairman uses a scraper to produce the desired finish.

REPAIR JIG BORER: Patient hand scraping reshapes a German-made jig borer, fitted with a new working head.

Low-Sulphur Steelmaking Proves Out on Tonnage Basis

By H. W. McQuaid—Consultant, Cleveland

For a new steelmaking process to succeed, it must meet the challenge of tonnage production.

The rotary reactor process for desulphurizing steel can now lay claim to having made the grade.

▪ Introducing a new steelmaking process—whatever its merits—is always an uphill climb. Production experience is the most powerful argument for proving a process' worth, but it is almost impossible for a newcomer to attain.

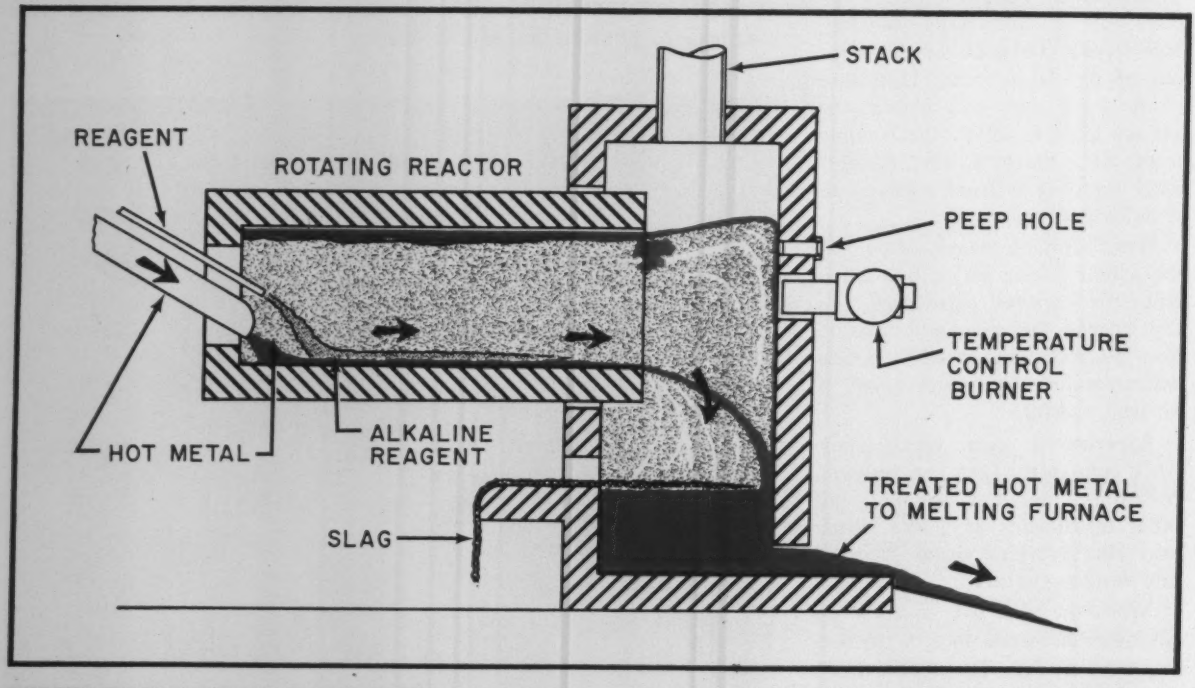
Now a relatively new process has cleared this hurdle; it shows a rapid and drastic reduction of sulphur and silicon contents of hot metal—on a tonnage basis.

Has a Good Start—When the "rotary reactor" method of desulphurization as patented by Norman Goss of Cleveland, was first announced a little over two years ago (The IRON AGE, Sept. 19, 1957, pp. 143-44), it had already undergone extensive testing on a laboratory level. In a program sponsored by Diamond Alkali Co., Cleveland, this preliminary research had been completed at Battelle Memorial Institute, Columbus, O.

By using caustic soda and other strong alkalis, the rotary reactor reduces sulphur content in either liquid iron or steel even under strongly oxidizing conditions. What's more, it does the job without damaging refractories or creating hazardous working conditions.

Introduces Oxygen—In addition to cutting sulphur content to desirable low level, it reduces silicon, carbon, and phosphorous by the combined use of oxygen and iron oxide.

Rotary Reactor Relieves Sulphur Problem



DISCHARGES LOW-SULPHUR STEEL: Hot metal alkalis, and heat from burner converge in furnace, spun by rotating rollers. (Drawing is not to scale.) After treatment, the hot, low-sulphur metal is ready for transfer to either the openhearth or electric furnace for completion of the steelmaking process.

On the basis of the Battelle tests, the process is fast and flexible. It lowered both silicon and sulphur contents simultaneously—in a matter of seconds.

A sulphur content of 0.10 pct, for example, fell to below 0.02 pct in one or two minutes. This is not the lowest sulphur limit the process achieves. Using cautic soda, sulphur could be brought down to less than 0.002 pct.

Design is Simple—Such results are achieved in a simply designed rotary reactor—basically a cylindrically-shaped drum open at both ends. Hot metal pours into the drum at one open end and is forced to move through it by a shoulder on this end of the drum. A gas burner, at the other end, supplies heat.

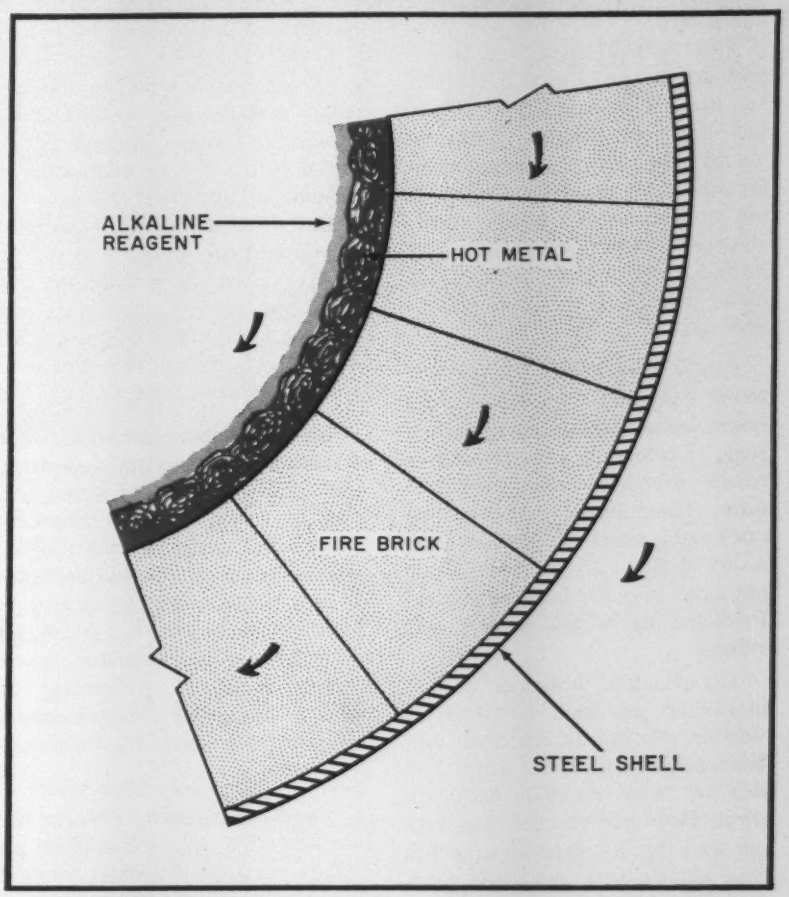
The drum is spun at a high rate of speed by supporting rollers located beneath its bottom. As a result of the spinning action, centrifugal force spreads incoming metal in a thin layer over the drum's inside surface, and coats it under pressure with the desired reagent.

In proportion to the volume of metal in the drum, the surface area of the metal, coating its sides, is very large. This thin layer of exposed molten metal is ideally spread for rapid and thorough chemical reaction. Once exposed to the chemical agents required to remove silicon and sulphur, total reaction time may be no more than 10-20 seconds.

Ready for Openhearth—In removing sulphur alone by chemical combination with strong alkalis, hot metal temperature drops not more than 75°F. When oxygen and iron oxide are added to remove silicon as well as sulphur, some heat results from the combination of silicon and oxygen.

Under these conditions, there is little or no temperature loss. But in either case, the resultant hot metal is ready for transfer to either the openhearth or an electric furnace for completion of the steelmaking process.

Spin for Slag-Metal Contact



EXPOSES HOT METAL: Spinning action of the rotary furnace spreads the incoming materials in a thin layer over the drum's inside surface. Rapid and thorough reduction of silicon and sulphur takes place.

The chemical reactions involved in the removal of sulphur are very fast and rather complex. They mainly involve the teaming up of sulphur-and-silicon-containing compounds in the metal with the molten alkali additive.

Moreover, when preheated iron ore and oxygen are introduced, the chemical reaction contributes heat, and this results in a great savings in heat along with the removal of silicon.

Try Production Runs—The excellent results obtained with the rotary reactor at Battelle were given further confirmation in production runs at the W. O. Larson Foundry, Grafton, O.

A 60-ton per hour unit cut silicon 69 pct and phosphorous 28 pct—in addition to its desulphurizing action.

The table gives a before-and-after check on six heats of cupola iron. The experience gained at the Larson Foundry prove that no major problems stand in the way of putting the rotary reactor into full commercial operation.

Process Hot Metal—Where could the rotary reactor be applied most profitably in a steelmaking operation? The best looking application is in the processing of hot metal from the blast furnace or ore reduction unit.

All desulphurization and desili-

conizing would be handled externally; and charging practice could be relaxed with the sulphur problem solved.

There are, at least, five important advantages. Furnace capacity can increase by as much as 10 pct; the limestone burden could be greatly reduced; coke requirements are lower; it would be possible to use a cheaper coke with a higher sulphur content—without compromising metal quality; there can be closer control of the blast furnace product.

Feeds Openhearth — This external treatment of hot metal can relieve openhearth production problems. Exothermic desiliconization results in higher charging temperatures. These insure faster melting rates and a boost in openhearth capacity of about 25 pct. Low silicon hot metal also cuts back on ore and limestone needs and lowers slag volume.

The standard Bessemer process makes no provision for lowering sulphur content during steel production. But with a hot metal feed that has been externally desulphurized, Bessemer practice can turn out steel that is competitive quality-wise with the best openhearth product.

Also, by removing excess silicon from high-silicon iron beforehand, a converter operation reaps the benefits of better temperature control and shorter blowing periods.

Aids Electric Practice — There are limitations to the use of ordinary hot metal in the electric furnace. Such additions call for large quantities of limestone and iron ore.

Great volumes of carbon monoxide are released, and the boiling action may become uncontrollable. Moreover, furnace capacity is reduced by the development of large volumes of slag.

But when desiliconized and desulphurized hot metal (0.10 pct Si, 2 pct C) replaces ordinary hot metal, only 50 pct as much oxygen need be used; ore additions are reduced; and most of the limestone addition is eliminated

Could Double Output — Since less carbon monoxide is evolved, and smaller volumes of stone, ore, and slag result, the use of externally treated hot metal should roughly double the furnace output normally obtained with a cold scrap charge.

Another important advantage with the use of externally treated molten metal is a lowering of power, time, and electrode costs. This saving is about 50 pct of normal costs.

Another Approach—Efficient decarbonization in steelmaking requires extra close contact between metal and reactive agent, temperature control, and removal of the carbon monoxide formed. It is believed that the rotary reactor will ease decarbonization in the production of a low quality steel. It should also provide fume control and low metal loss.

Presumably, steelmaking would involve two reactors arranged in series. Molten metal from the blast-furnace electric-arc reduction units or cupola would be treated in the first of these to remove sulphur, silicon, and some phosphorous.

The exothermic desiliconization reaction should raise the temperature from about 2350° to 2800°F. Removal of carbon and the remaining phosphorous would be the role of the second reactor.

Removes Slag—Since it is a continuous process, incoming metal would always be in contact with fresh additives. The slag produced could be continuously removed, eliminating possible contamination. To make a product of higher quality, the steel produced by this process could be further refined in an electric arc furnace.

In the blast furnace, iron ore is reduced to metallic iron by reaction with gaseous carbon monoxide; is then melted in the lower zone of the furnace. It is possible that the rotary reactor could reverse this process by first melting the ore and then reducing it from the oxide form.

The special melting unit would melt ore continuously under oxidizing conditions in contrast with the reducing conditions of the blast furnace. By this means, an integrated system achieves an increase in thermal efficiency.

The treatment of the molten iron from a submerged arc iron ore smelting unit with a rotary reactor before charging into a standard arc steelmaking furnace, should be a real step forward. It could, with little trouble, be developed as a continuous steelmaking unit from ore to billet—if operated in combination with a continuous casting unit.

Reduces Sulphur in Iron

Sulphur Content of Cupola Iron, pct

Heat No.	Before	After
1	0.072	0.014
2	0.079	0.016
3	0.075	0.019
4	0.099	0.013
5	0.088	0.020
6	0.083	0.021

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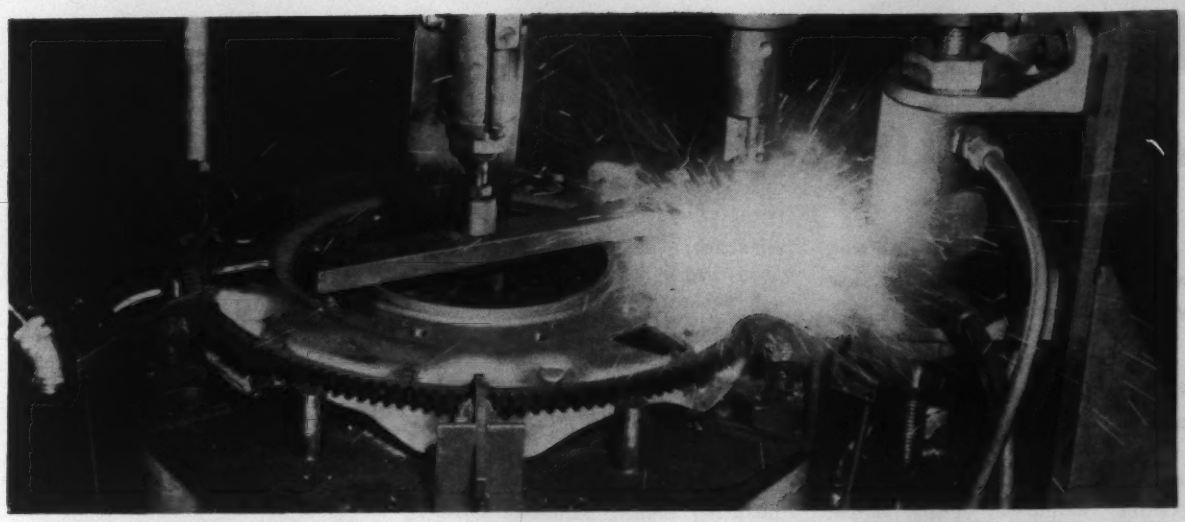


STARTING THE ARC: Every time the table indexes 30°, another weld is made by CO_2 welding process.

Link Automation to CO_2 Welding

A few added fixtures can make your present CO_2 welding setup that much more valuable to the production line.

It spells faster output with a minimum of operator risk.

■ With a few conventional fixtures and controls, plus some ingenuity, tool engineers at Borg & Beck Div. of Borg Warner Corp., Chicago, have automated a multiple-weld arcwelding operation. This new setup frees the operator to perform other jobs concurrently.

The parts welded are a starter ring gear of AISI 1045 carbon steel and a mild steel pressed clutch housing. They are joined by 12 intermittent welds spaced at 30° intervals around the circumference of the joint. The final assembly goes into one of the new compact cars.

The company is achieving good results from the arcwelding process in use, the Dual-Shield process. Developed by the National Cylinder Gas Div. of Chemetron Corp., Chicago, the process has several advantages.

Flux-Cored Wire—First of all, the parts to be welded need no special preparation. Secondly, the process is self-fluxing, the reason being that the welding wire itself is cored with flux. And the slag also is self-removing. Inexpensive CO_2 serves as the shielding gas.

Borg & Beck has designed its new setup so that conventional controls and equipment are interconnected with the welding machine controls. Parts to be welded are clamped onto an air-operated index table. The table indexes 12 times per operation.

Control of the welding cycle at each index point is in the hands of the Dual-Shield control unit. Flux-cored welding wire feeds automatically to the welding gun during each 1/5-second welding cycle.

Flip of a Switch—After 12 complete cycles a cam on the index table contacts the index switch, halting the sequence. The operation starts again with a flip of a switch just as soon as another housing and gear are locked in place.

Arcwelding equipment includes a 500-amp dc rectifier welding machine having constant voltage characteristics. The flux-cored electrode wire is a plain carbon steel type (5/64 in. in diam).

Welding on this job is performed at 19 to 23 v and 275 amp. Wire feeds run about 140 ipm. The operation consumes around 52 cu ft of CO_2 per hour.

In Operation — To set up for welding, the clutch housing is first placed on the index table; then positioned by the six studs on top of the table. The starter ring gear fits right over the housing. Both parts are then clamped together.

As soon as one weld is completed, a solenoid valve operates the welding gun piston, raising the gun. When the gun reaches the top of its stroke, a limit switch actuates another solenoid valve. The table then indexes.

At the next index point an air pressure switch activates an air valve that depresses the gun once again to the work. At the bottom of the gun's stroke another limit switch energizes the welding control unit and the cycle begins again.

New Anodic Process Hard-Coats Aluminum Parts at High Speed

Heart of a new anodizing method is its ability to use very high current densities.

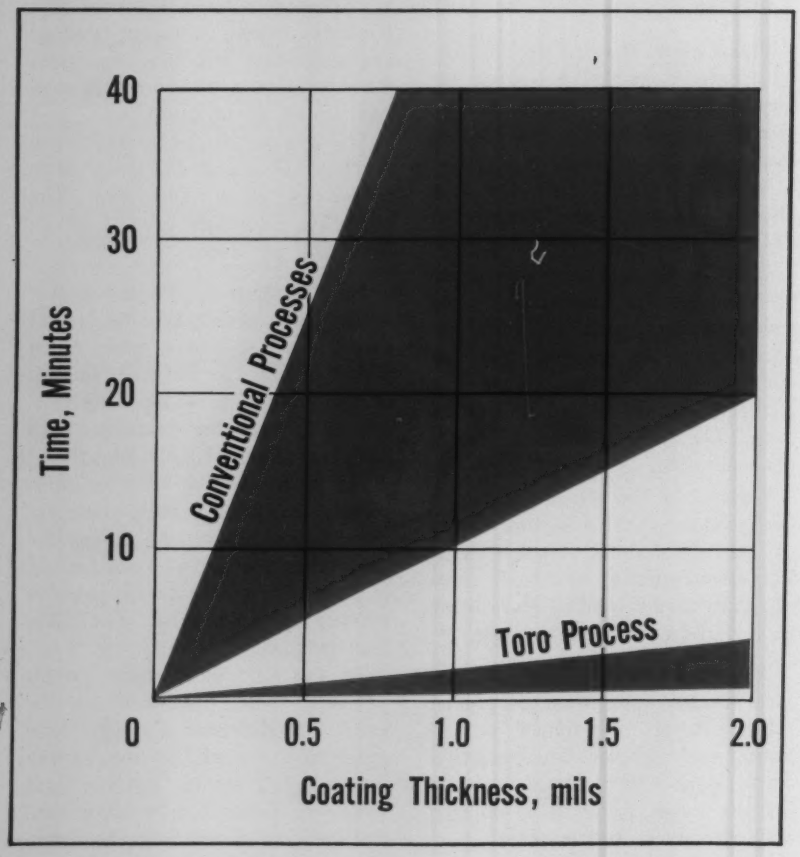
Coatings, equal in quality to those produced by other methods, are light in color.

▪ An improved method of hard-coating aluminum parts should challenge older hard-coating methods. The process is said to be 10 to 50 times faster than conventional setups.

Besides greater speed, the process also claims increased electrical efficiency, reduced refrigeration needs and lighter color of end product. It's expected to expand use of hard-coat aluminum for such items as pistons, gears, automotive parts, helicopter blades, architectural components and kitchen utensils.

Search for Toughness — The method's developer, Toro Manufacturing Corp., Minneapolis, became interested in hard-anodizing to meet a practical problem of its own. It was the need for a tough finish to protect aluminum reels for power mowers from the eroding effects of normal wear.

New Method Cuts Time Cycle



The company's Research and Development Center took over the task of finding a faster way of hard-coating aluminum parts. The new process results from four year's developmental work.

Like other aluminum anodizing processes, the new method electrochemically produces on the surface of the metal a film of aluminum oxide. It gives the part great resistance to abrasion, and low heat and electrical conductivity. Further, the coating can be ground to extreme accuracies to provide a smooth, low-friction surface.

High Current Density — The heart of the new process is its ability to utilize very high current densities without burning the aluminum. Where other methods employ current densities between 25 and 100 amp per sq ft, the new system increases this level 20- to 40-fold. These high currents, in turn, permit greater speed in anodizing parts.

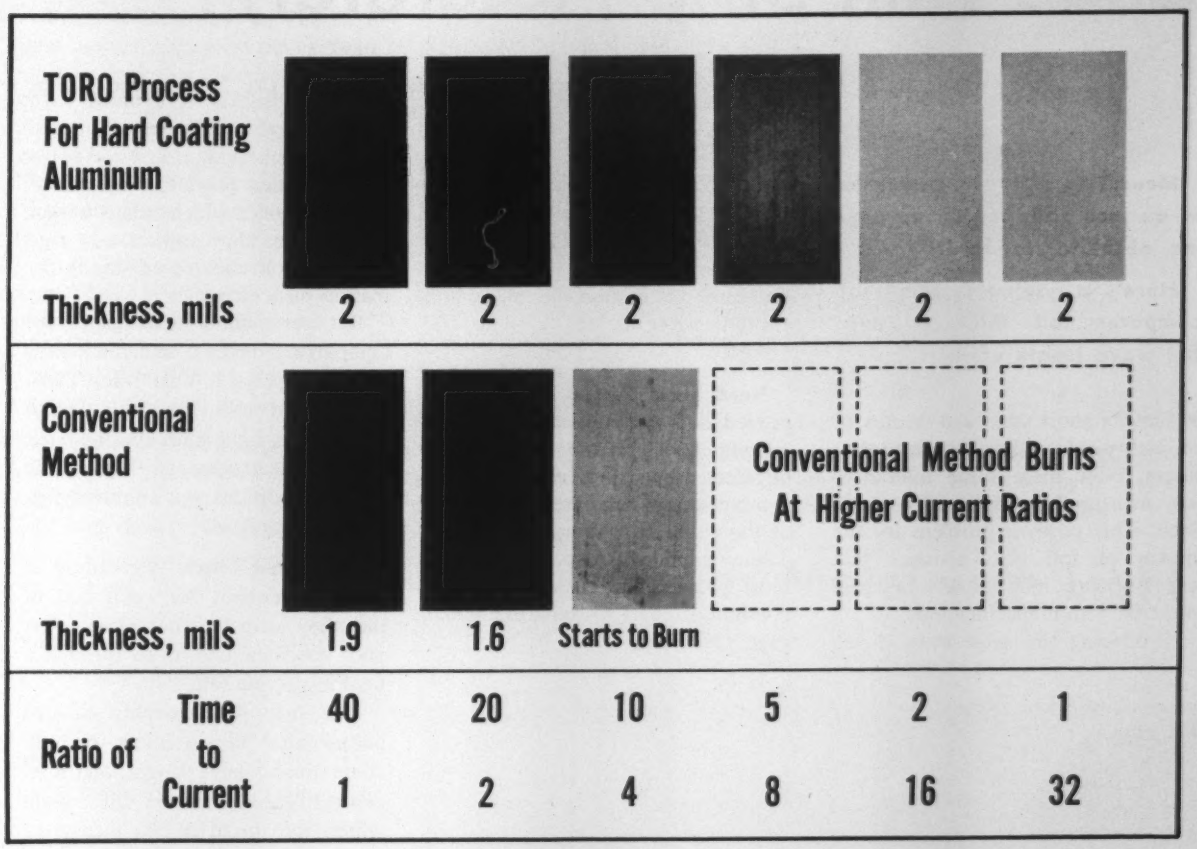
Ordinary processes require between 10 to 50 minutes to build a protective surface coating 0.001 in. thick. The Toro method does the same job in 1 minute.

As a result of this extremely brief exposure to the acid of the electrolyte, the coatings produced are light in color, ranging from a silver gray to a medium gray. This contrasts with the black and dark gray obtained by usual methods.

Lighter Color — For example, aluminum starts to burn at a 10-4 time-current ratio under one conventional method. The new process, even at a 1-32 ratio, produces a 2.0-mil coating that is silvery gray.

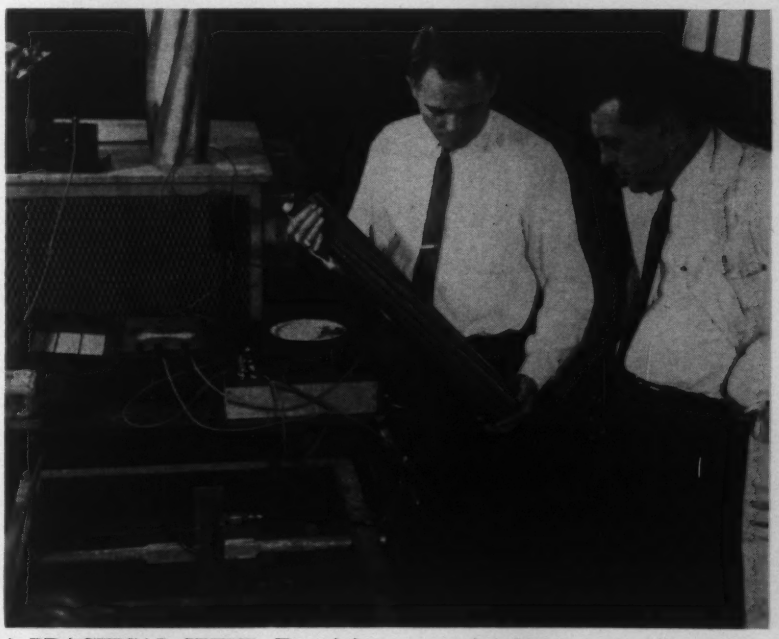
These lighter coatings make dyeing possible in a wide range of colors. In addition the process operates at an electrolyte temperature of about 70°F.

Greater Current Density Is Key to Fast Coating



Stands Up To Tests—In a study to determine the physical and chemical characteristics of the coatings, the Armour Research Foundation of the Illinois Institute of Technology makes this report: Comparative tests between conventional anodic hard coatings and Toro coatings show them to be "essentially the same in hardness, abrasion resistance, frictional properties, corrosion resistance, electrical resistance and density."

Don O. Benson, director of research and development for Toro, points out: "If we had studied all of the literature on the subject before we began the project we would doubtless have become discouraged and dropped the whole thing. All the available material indicated that there was no use in attempting to hard-coat aluminum quickly. But here we are doing it."



A PRACTICAL SETUP: Examining a part that has been hard-coated by new method are D. O. Benson (left) and J. J. Snegoski, research engineer.

Gage Thin Strip Accurately

By J. A. Buza—Ass't Chief Engineer, The Wallingford Steel Co., Wallingford, Conn.

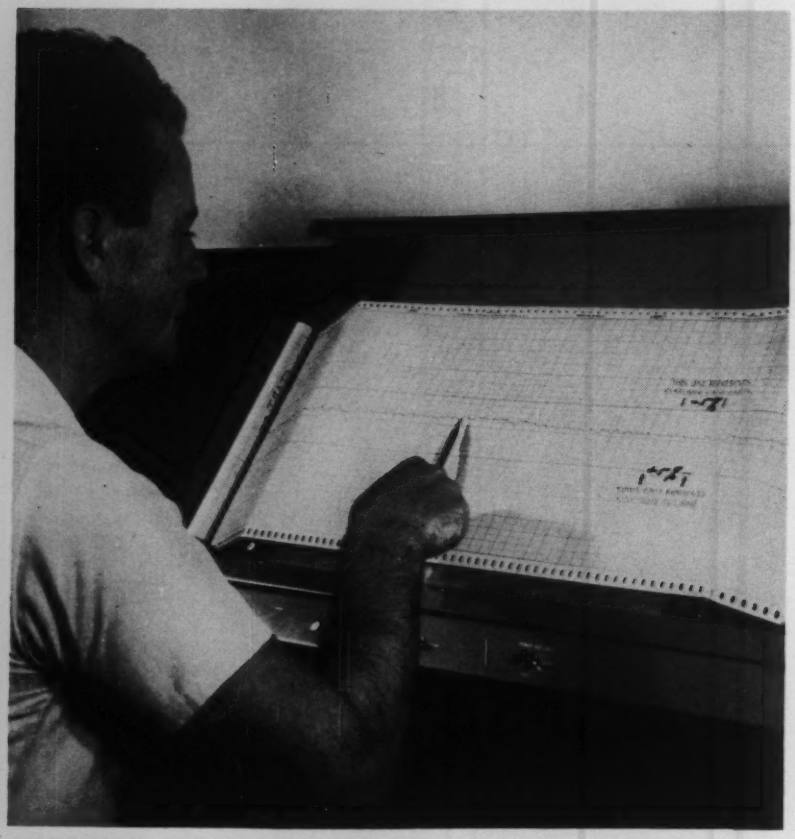
Measuring strip to millionths of an inch calls for an unvarying, absolute standard.

Here's a gaging system that compares foil thickness with the wave length of light.

▪ Only a short time ago, tenths of an inch would suffice for strip tolerances. Now these same tolerances are measured in millionths of an inch. This poses a problem for the maker of foil who assumes that every square inch of his material must be within specifications.

Producing this gage strip is just one phase of the problem. Measuring the product to insure dimensional reliability—with the most exacting means available — is another. The entire coil must be measured not only along its length but across its width.

Need Short System — What is needed is a system that has as few components as possible. It must not be affected by strip density. It needs equipment to compare thicknesses of the calibrating sample to an absolute standard. Also, the system must provide the customer with a continuous chart to show the actual gage variation.



DOES STRIP MEET TOLERANCES? The continuous chart made of every coil points out the strip gage variation in millionths of an inch.

Wallingford Steel Co. uses non-contact devices which relate weight to thickness. They continuously gage the alloy foil and record this information on a chart.

But these non-contact gages are comparison devices; and the standard used plays a vital role. Thus, Wallingford uses the wave length of a specific light source as the basis for all measurements. Under the proper conditions, it is an unvarying, absolute standard.

Gets Final Check—Procedure at Wallingford calls for each coil of the alloy strip that has close tolerance specifications to go through a final inspection line.

The strip is thoroughly cleaned before final measurement because contaminants have weight; and non-contact gages measure all weight within the throat of the measuring head.

A sample is taken from the coil and delivered to a temperature controlled room maintained at 68°F. In this room, the sample is measured with a Fringecount Micrometer made by Link Aviation Inc., Binghamton, N. Y. This unit compares the thickness of the sample to the wave length of a krypton light source.

Combined Unit — How does the instrument work? It consists of three parts; interferometer, control box, and counter.

The interferometer contains a beam splitter which breaks a single, spectral light source into two beams. One beam is directed toward a fixed prism reflector which moves with the measuring spindle.

The two light beams combine at a glass combining plate, where an interference is produced. They are then directed up to a multiplier

phototube where the interference fringes are counted.

Beam is Retarded — The same light source also produces a beam which is phase-retarded 90° at the beam splitter; it is then directed down to the movable prism. This retarded beam also combines with the fixed length beam to produce an interference fringe which is picked up by a second multiplier phototube.

Each photomultiplier, therefore, receives an interference fringe, the phase of which is displaced 90° from the other. This provides a sense of direction to the counter, enabling it to count up or down.

Zeroes to Standard—As the operator moves the measuring head to gage the thickness of the sample, light from the krypton lamp is modulated; the two photomultipliers detect these signals and transmit them to the counter.

After measuring, the sample returns to the line; the gaging equipment is zeroed against the known thickness, and processing starts up again.

By taking a sample from each coil, it is almost impossible to have an error caused by variation in density between the different alloys.

As the end of the coil approaches, the line is stopped; the area of steel that is being measured at that time is marked, carefully cut from the coil, and measured with the interferometer.

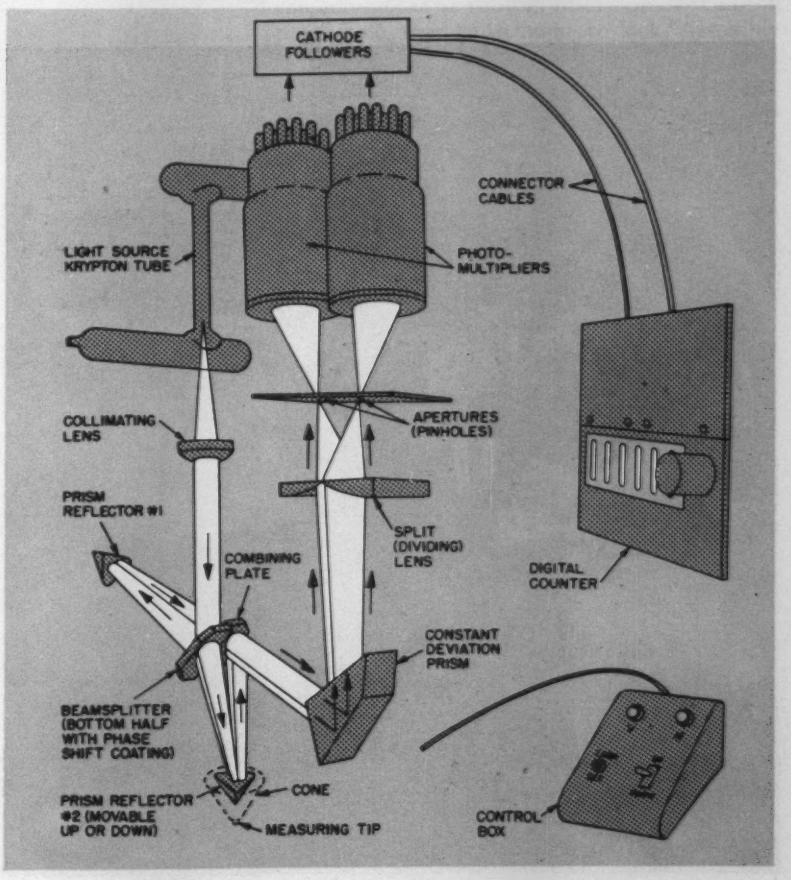
Notes Errors—If there is any disagreement between the thickness of the sample and the indicated thickness on the gage chart, we know right away that a malfunction has occurred, and corrective action can be taken.

After this procedure, the chart is reviewed by Quality Control personnel to insure that every inch of the coil is within specifications.

In this manner, 26 in. wide foil, of such alloys as A-286, AM-350, AM-355, Rene 41, and the conventional stainless grades are made to gage tolerances of 30 millionths of an inch.

CHECKS SAMPLE GAGE: Technician measures thickness of test piece with system that compares metal thickness to wave length of light. Use of light, under proper conditions, is an unvarying, absolute standard.

Gages Metal with Light



MEASURES AND MODULATES: Movement of measuring tip modulates krypton light source and produces fringes which are detected and counted. This reading is then converted to thickness of the test piece.

Machine Speeds Shaft Repair

Repair of industrial crankshafts saves 40-60 pct of the cost of new shafts.

A portable unit mills keyways without removing the heavy crankshafts from the lathe.

▪ Repair of industrial crankshafts saves 40-60 pct of the cost of new shafts. It also can cut machine downtime about 75 pct.

Industrial Welding & Brazing, Inc., Lansing, Mich. specializes in industrial crankshaft repair. They handle shafts weighing up to 50 tons.

Repair of light shafts, with diameters of 4-5 in., takes 3-4 days. Larger shafts require more time. But, even the largest 50-ton giants can be done in two weeks.

Credit Portable Unit—A company official, Mr. T. W. Campbell, credits Dumore Versa-Mil portable machining units, built by The Dumore Co., Racine, Wis., with a big part in the fast repair work.

After we weld the breaks in an industrial crankshaft, says Mr. Campbell, we mount the shaft in a lathe. Using the Dumore unit, we complete all machining without removing the job from the lathe.

The portable machining unit, mounted on the lathe, mills all shaft keyways. This eliminates the need for moving the heavy repair parts to vertical milling machines.

Join Broken Ends—In a typical repair job, a plant engineer inspects the broken shaft. He notes all cracks and flaws. A cutting torch "vees" out the flaws. Then the voids are filled, and broken parts jointed, with an electrode. The filler combines high tensile strength with good hardenability.

Before annealing, all surfaces in the reworked areas—including the keyways—are built up with a metal filler. This aids re-machining.

A steel furnace is tack-welded around the shaft. Then heat treating takes place at 1500°F. Using this method, shaft size is no problem.

The shafts remain in the furnace about an hour for each inch of diameter. Average time is 8 hours. Cooling takes place in the furnace.

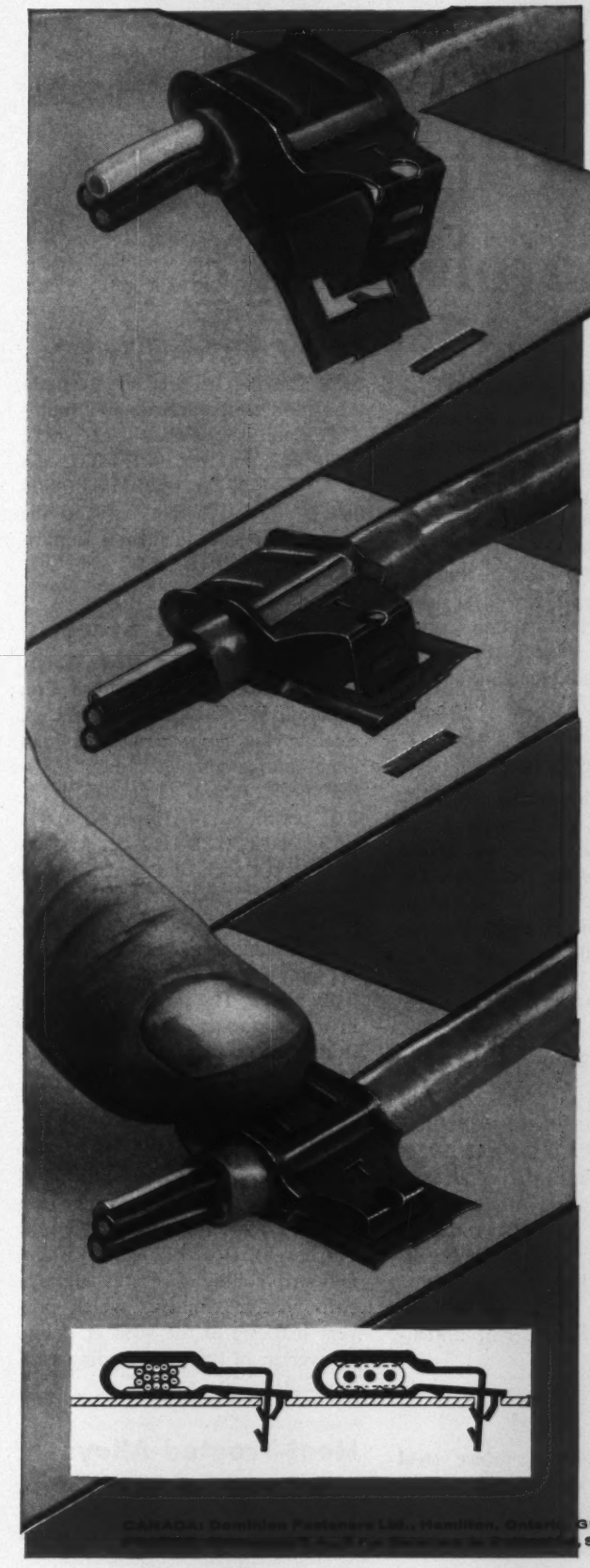
Straighten in Lathe — Prior to machining, a steel block is welded to one end of the shaft. The chuck of the lathe holds the block to support the shaft. This allows the lathe operator to machine all the way to the shaft's end—without reversing the shaft in the lathe.

In the lathe a straightness check takes place. If the shaft is bent so that it requires more metal removal than the buildup will allow, it's straightened in the lathe. Using propane torches and hydraulic jacks, it's relatively easy to bend the shaft back into shape.

Counterbalances welded to the shaft checks, allow turning at high speed rates. After machining, a cutting torch is used to remove the counterbalances and the block from the end of the shaft.

It's reported that repaired crankshafts last as long, and often longer, than new shafts. Yet, repair costs average 40-60 pct less than the cost of new shafts. Of even greater importance, however, is the amount of downtime saved by repairing broken shafts.

NO EXTRA HANDLING: After the main bearings are completed, milling takes place. A portable machining unit, mounted on the tool post, handles milling operations. Milling machines aren't even required.



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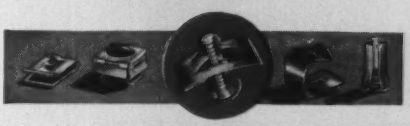

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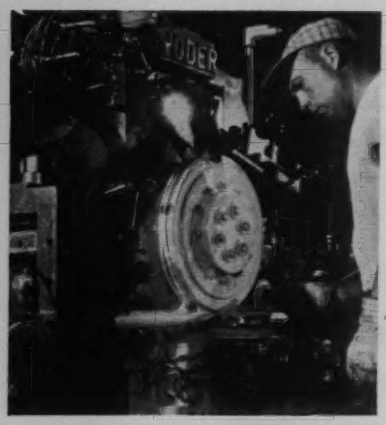

Yoder Tube Mills speed tailpipe production at AP Parts Corporation

The AP Parts Corporation (Toledo, Ohio), world's largest producer of replacement mufflers and tailpipes, uses 2 YODER Tube Mills to produce more than *300* ft. of 1¾", 1⅞" and 2" tubing per minute.

According to Mr. John Grindle, Plant Engineer, the two-man operated YODER Mills are vital to the production of the entire plant. "YODER Tube Mills earn their keep daily. They are easy to set up, maintain and operate ... the welds are clean and uniform. We depend on them for constant quality, high production and minimum downtime".

The YODER Tube Mills at AP Parts exemplify the production economies and dependability of all YODER-built equipment, whether it be Pipe and Tube Mills, Cold Roll-Forming Machinery or Slitting Equipment.

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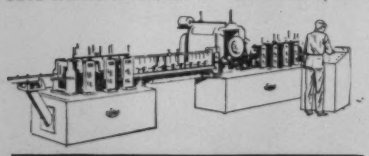


ENGINEERING YODER MANUFACTURING
PIPE AND TUBE MILLS
(ferrous or non-ferrous)

New Patents In Metalworking

Liquid Loss Reduced

Process for ultrasonic quenching of steel articles, T. J. Bulat (assigned to Bendix Aviation Corp., Davenport, Ia.), Jan. 12, 1960. Quench liquid loss, in the quenching of steel objects, is reduced by passing ultrasonic waves through the liquid at an energy level sufficient to produce cavitation at the surface of the object during its removal from the quenching liquid. No. 2,920,988.

Chromizing Steel

Process of chromizing air-hardening tool steel, G. A. Samuel and J. V. Bell (assigned to David Craven, Wilmington, Del.), Jan. 19, 1960. Method for obtaining a hard, abrasion-resistant case on air-hardening tool steels, whereby surface decarburization is reduced or eliminated. No. 2,921,877.

Moist Ball Hardening

Pelletizing furnace, P. L. Steffensen (assigned to Bethlehem Steel Co., a corp. of Pa.), Dec. 22, 1959. Design for an improved shaft furnace for indurating a continuous charge of moist balls, consisting of magnetite fines and a finely divided fuel, and continuously discharging fairly large and uniform dry pellets of Fe_2O_3. No. 2,918,-267.

Low-Alloy Steel

Low-transition-temperature steel alloy, R. H. Frazier (assigned to U. S. Sec. of the Navy), Dec. 29, 1959. A hot-rolled killed low-alloy steel, having an impact strength-transition temperature below minus 60°F, consists of 0.18-0.22 pct C, 0.70-0.87 pct Mn, 0.014-0.02 pct P, 0.022-0.032 pct S, 0.003-0.006 pct N, 0.03-0.22 pct Al, and the balance Fe and incidental impurities. No. 2,919,187.

High-Strength Steel

High-strength alloy steels, C. A. Furgason (assigned to Ladish Co., Cudahy, Wis.), Dec. 29, 1959. A steel having high strength at high temperatures comprises about 0.40-0.50 pct C, 0.58-0.93 pct Mn, 0.13-0.32 pct Si, 0.35-0.75 pct Ni, 0.87-1.23 pct Cr, 0.88-1.12 pct Mo. up to 0.01 pct each of P and S, up to 0.1 pct V, and the balance essentially all Fe. The metal is re-melted in a vacuum-arc consumable electrode remelt furnace. No. 2,919,-188.

"Patent Review" appears in the third issue of The IRON AGE each month. Look for it in the March 17 issue.

Coiling Apparatus

Apparatus for coiling strip material, J. W. O'Brien (assigned to United Engineering & Foundry Co., Pittsburgh), Dec. 22, 1959. Rolling mill strip-coiling apparatus employs strip guiding elements which prevent marking of the strip at points of overlap of the strip leading end. No. 2,918,226.

Heat-Treated Alloys

Heat treating nickel-iron alloys, R. G. Aspden and N. I. Ananthanarayanan (assigned to Westing-

house Electric Corp., E. Pittsburgh), Jan. 19, 1960. To prepare nickel-iron sheet for magnetic applications, a plate, consisting of 40-80 pct Ni, 0.1-2.0 pct of Mn, Al, Cr, or Si, and the remainder Fe, is cold reduced, annealed in an oxidizing atmosphere to oxidize the Mn, Al, Cr, or Si, and then finished annealed in a non-oxidizing atmosphere. No. 2,921,878.

Aluminum-Coated Steel

Aluminum-coated steel having chromium in diffusion layer, R. F. Thomson (assigned to General Motors Corp., Detroit), Dec. 22, 1959. Manufacture of an aluminum-coated ferrous metal article, having improved ductility at room temperature and elevated temperatures. A diffusion layer of aluminum and chromium is applied by hot dipping the article. No. 2,917,818.

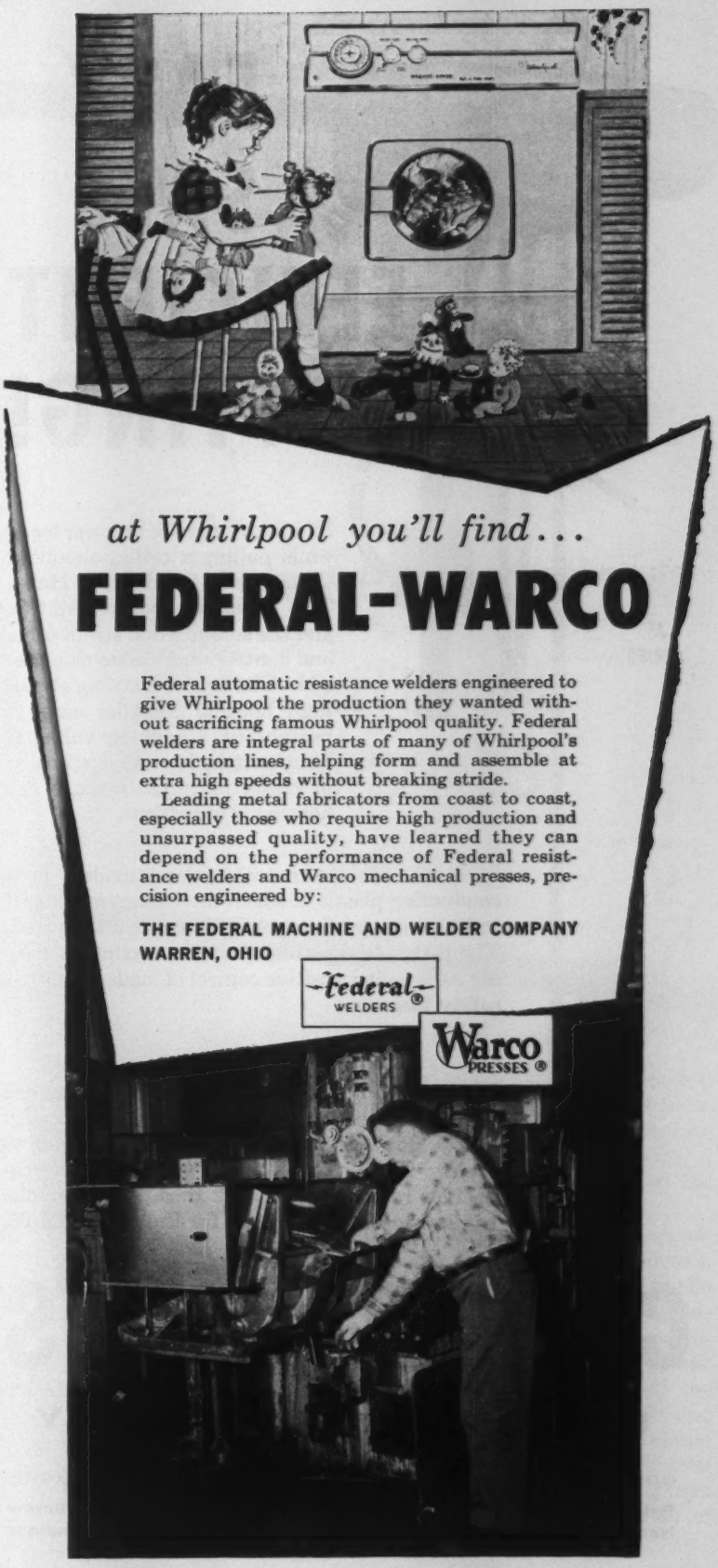
Pellet-Forming Drum

Balling drum, H. T. Stirling (assigned to Koppers Co., Inc., a corp. of Del.), Jan. 12, 1960. Improved rotary drum for use in agglomerating iron ore fines or the like into firm, coherent pellets or balls. These will form beds of high gas permeability suitable for high-speed sintering. An added binder is not required. No. 2,920,344.

Composition Control

Method for controlling compositions of molten pig iron and slag in a blast furnace, K. Kanamori, K. Endo, K. Kodama and M. Tokuhisa. (assigned to Yawata Seitetsu K.K., Tokyo-To, Japan), Dec. 22, 1959. In the smelting of pig iron in a blast furnace, a powdered conditioning agent is blown downward into the slag to adjust the pig iron or slag composition. Materials that may be thus introduced include ferrosilicon, ferro-manganese, silico-manganese, calcium silicide, and lime. No. 2,918,365.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.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Leading metal fabricators from coast to coast, especially those who require high production and unsurpassed quality, have learned they can depend on the performance of Federal resistance welders and Warco mechanical presses, precision engineered by:
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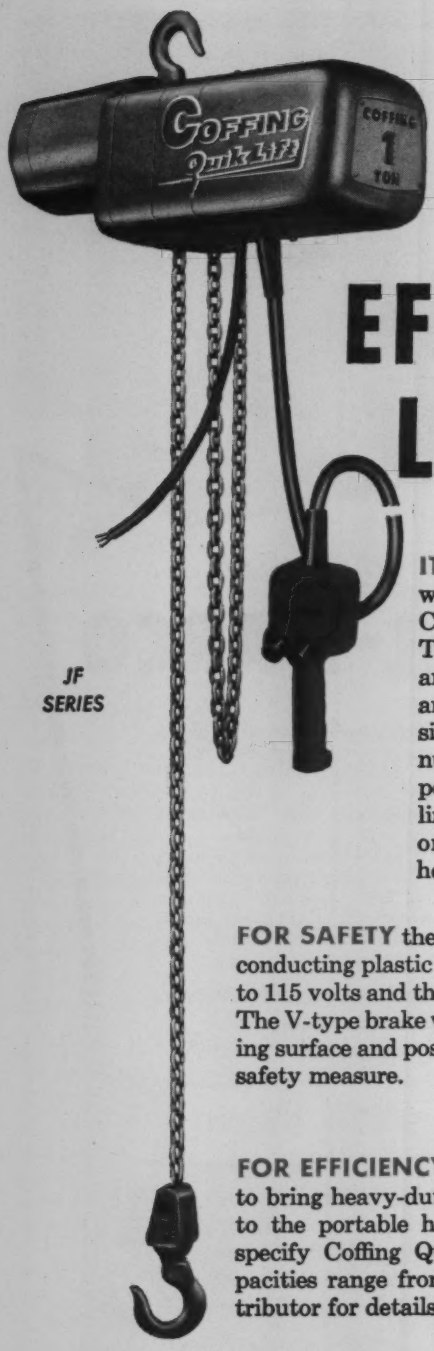
Federal WELDERS
Warco PRESSES



JF SERIES

EASY SAFE EFFICIENT LIFTING!

IT'S EASY to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The pistol-grip control station and the combination strain cable and control cord makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

FOR SAFETY the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety measure.

FOR EFFICIENCY this hoist has been designed to bring heavy-duty performance plus durability to the portable hoist field. It will pay you to specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

COFFING HOISTS

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Ratchet Lever • Air
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Ratchet • Screw
Hydraulic • Worm Gear

FREE LITERATURE

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 129.

Heat Exchangers

Descriptive, installation, and operation information on plate, bayonet, and coil type immersion heat exchangers is available in a 12-page bulletin. Dimensions and installation instructions on circulating steam jets is included. The equipment is employed for heating or cooling corrosive solutions in all types of tanks. (National Carbon Co.)

For free copy circle No. 1 on postcard, p. 129

Circuit Breakers

A bulletin, featuring molded case circuit breakers, is available. Complete selection, application illustrations, outline drawings, and ordering information is included. (General Electric Co.)

For free copy circle No. 2 on postcard, p. 129

Air Tools

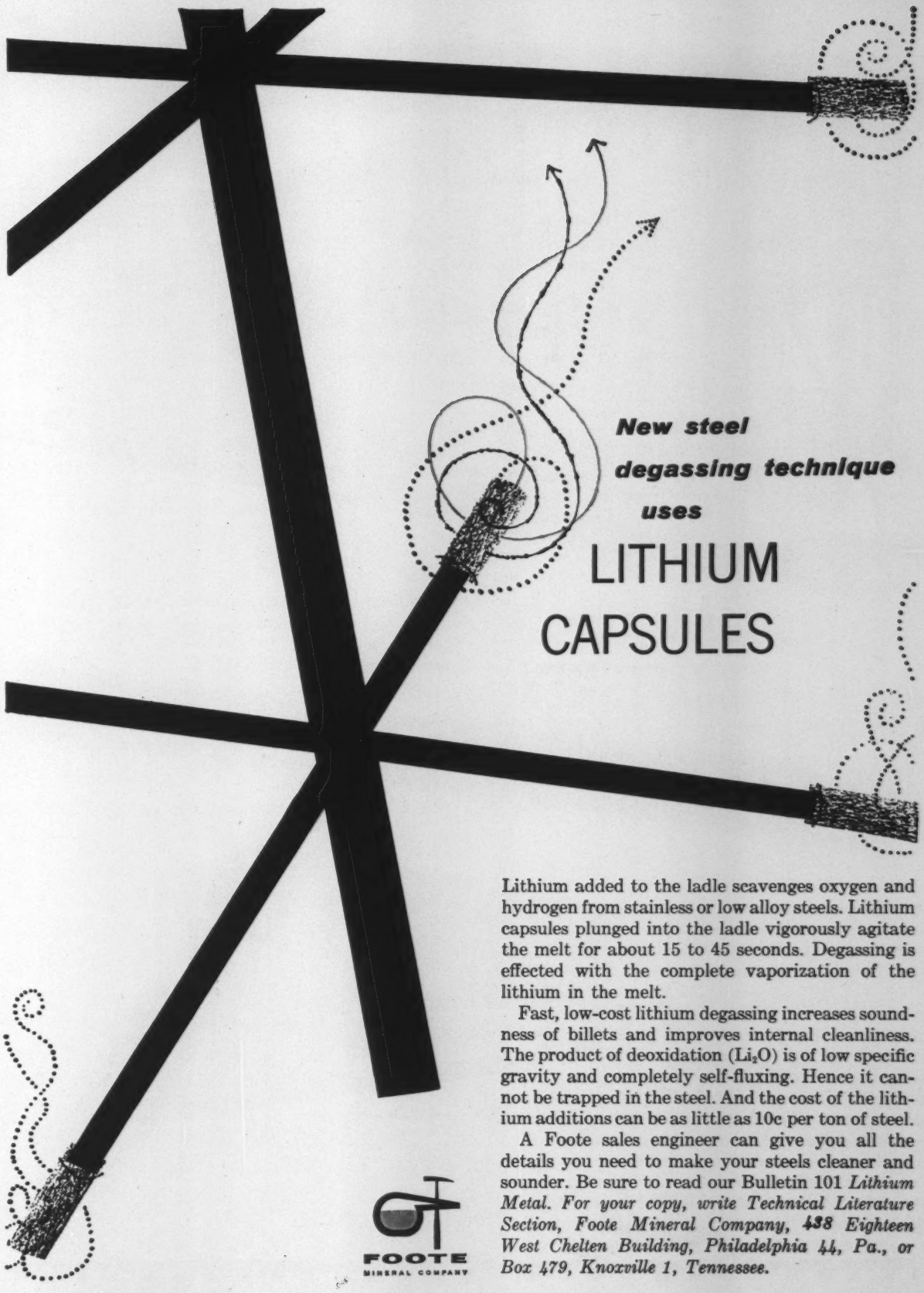
Specifications and features of silent compact screwdrivers, corner screwdrivers, nut runners, miniature screwdrivers, wrenches, tappers, grinders, and accessories are contained in a catalog. Detailed technical information, dimensions, and photos of tools is included. (Newage Industries, Inc.)

For free copy circle No. 3 on potcard, p. 129

Industrial Aids

A 128-page catalog is filled with hundreds of essential items of production, laboratory, and quality-control equipment; engineering and technical instruments, along with a guide to mathematics, science and optics. (Edmund Scientific Co.)

For free copy circle No. 4 on postcard, p. 129



New steel degassing technique uses

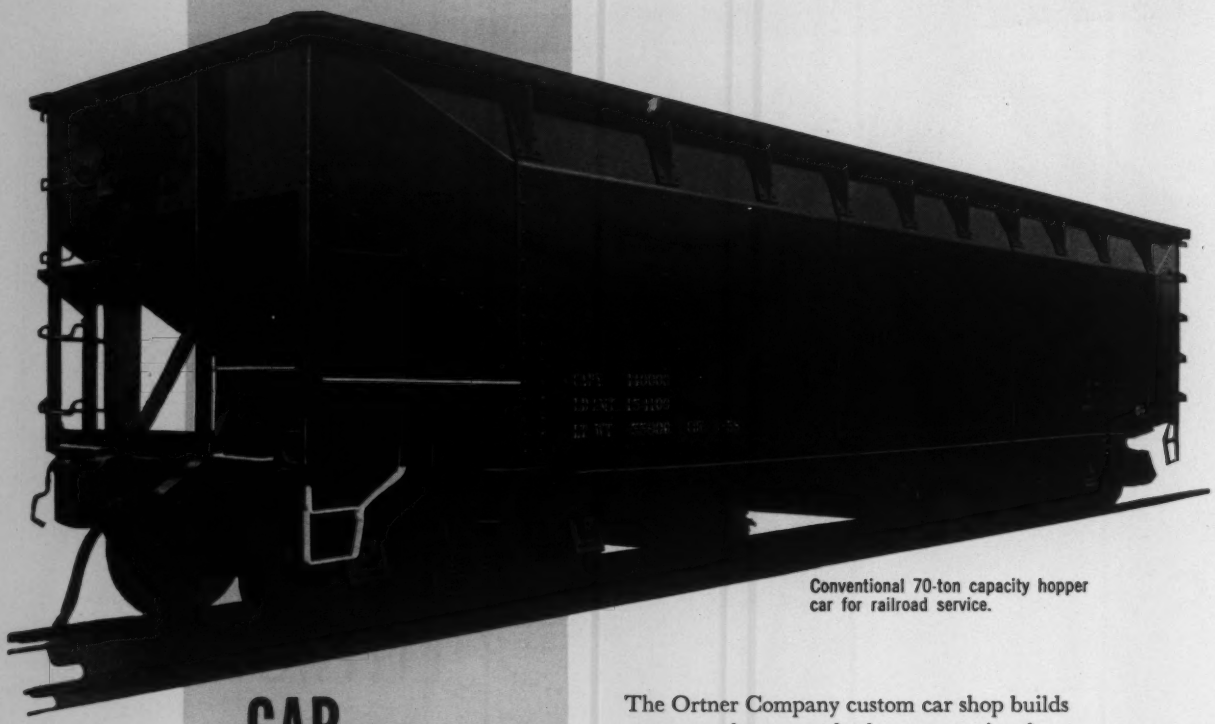
LITHIUM CAPSULES

Lithium added to the ladle scavenges oxygen and hydrogen from stainless or low alloy steels. Lithium capsules plunged into the ladle vigorously agitate the melt for about 15 to 45 seconds. Degassing is effected with the complete vaporization of the lithium in the melt.

Fast, low-cost lithium degassing increases soundness of billets and improves internal cleanliness. The product of deoxidation (Li_2O) is of low specific gravity and completely self-fluxing. Hence it cannot be trapped in the steel. And the cost of the lithium additions can be as little as 10c per ton of steel.

A Foote sales engineer can give you all the details you need to make your steels cleaner and sounder. Be sure to read our Bulletin 101 *Lithium Metal. For your copy, write Technical Literature Section, Foote Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pa., or Box 479, Knoxville 1, Tennessee.*

FOOTE
MINERAL COMPANY



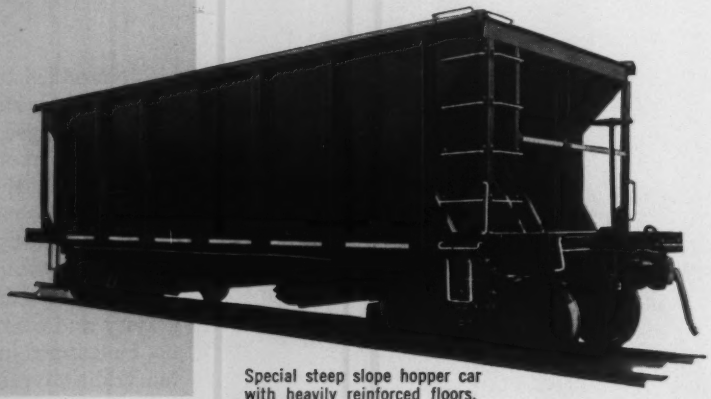
Conventional 70-ton capacity hopper car for railroad service.

CAR CRAFTSMEN

...to Railroads, to Industry

The Ortner Company custom car shop builds any type of non-standard or conventional car you require—hoppers, gondolas, flat cars, box cars, or special steel mill cars—in lots of 200 or less.

Send us your specifications or an outline of what you need. We will prepare a proposal for your consideration. Write to Ortner Company, 3181 Linwood Road, Cincinnati 8, Ohio.



Special steep slope hopper car with heavily reinforced floors, designed for quick unloading in heavy industrial plant service.

ORTNER CO CINCINNATI, OHIO

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Retainers, Wrenches

A new concept in retainers, with punches that can be pushed by hand into the retainer and removed with a simple pulling wrench while still in the press, is explained and illustrated in a six-page booklet featuring standard prices. Further information contained is that describing pivot pull wrenches designed to pull punches right through the stripper while the die is in the press. (Punch Div. of Pivot Punch and Die Corp.)

For free copy circle No. 5 on postcard

Industrial Engines

A bulletin describes and illustrates diesel and fuel gas engines for industrial, marine, and oil field service. Supplied are specifications and basic dimensions of the various models. The bulletin also reports on generator sets. (White Diesel Engine Div., The White Motor Co.)

For free copy circle No. 6 on postcard

Finishing Processes

Stamping, upset forging, rotoforging and other finishing processes are described in an illustrated bulletin. Case histories graphically illustrate how money can be saved. (Commercial Shearing & Stamping Co.)

For free copy circle No. 7 on postcard

Hand Torches

Information that a customer might need to make the proper selection for both general and special purpose gas welding and cutting torches appears in a 36-page catalog. General descriptions, features, specifications and illustrations for a complete line of gas welding and cutting hand torches, outfits, tips and accessories are provided. (Air Reduction Sales Co., div. of Air Reduction Co., Inc.)

For free copy circle No. 8 on postcard

Weld Fasteners

Incorporated in a 50-page book is extensive technical data and welding information. Complete dimensional information on all stock weld nuts, weld screws, special purpose weld parts and leg levelers is presented. This combination catalog and welding manual also includes electrode data, designs, weld setups, and an engineering section. (The Ohio Nut & Bolt Co.)

For free copy circle No. 9 on postcard

Gage Blocks

Full information on available sets, grades, and prices of stainless steel gage blocks is presented on a data sheet. Several outstanding features are discussed, such as durability, corrosion resistance, stability, and others. (The DoALL Co.)

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Hydrocarbon Detector

The operation, use, and specifications of a hydrocarbon detector are presented in an eight-page brochure. The portable instrument can be used for composition determination in metal-treating furnace atmospheres; or for a combustion efficiency measurement, and many other uses where fast and accurate measurement of hydrocarbon concentrations are desirable. (Instrument Div., Perkin-Elmer Corp.)

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Unitized Tooling

Helpful information for users of any types of punches and dies appears in a 20 page maintenance manual. (Punch Products Corp.)

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Drilling Manual

A 22-page technical manual reports on the problems, practices, techniques, and equipment for micro-drilling holes from 0.001- to

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FREE LITERATURE

0.020-in. diameter. Illustrated data includes list of sources for all related equipment necessary for efficient micro-drilling work. (The Dumore Co.)

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Equipment Leasing

A program of leasing diversified, non-expendable production equipment is explained in a brochure. Outlining reasons for leasing, the folder answers questions on leasing practice and procedure. (United States Leasing Corp.)

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Drill Presses

Information on 18- and 24-in. constant power gear-shift drill presses is contained in a brief brochure. Included are specifications and a full description of all features on seven models. (Boice-Crane Co.)

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Die Protection

Low cost ways to prevent damage to tools and dies with precision switches are described in five data sheets. Cross-sectional diagrams and construction details are included. (Micro Switch, Div. of Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 16 on postcard

Electrical Data

A 155-page catalog describes more than 2500 products in the line of electrical control, distribution and power equipment. Illustrations, specifications, wiring diagrams and pricing information are included. (Federal Pacific Electric Co.)

For free copy circle No. 17 on postcard

Impingement Filter

A seven-page booklet contains information in reference to an impingement filter. The filter provides an effective method of cleaning coolants and cutting oils containing ferrous and nonferrous contaminants. The data contained consists of: principles of design, operation, uses, model diagrams, filter advantages, and specifications. (Gale Separator Co., Div. of Infilco Inc.)

For free copy circle No. 18 on postcard

Electric Fork Truck

A 4000-lb capacity battery-powered fork truck is described in a four-page folder. Included are complete engineering and dimensional specifications. (Industrial Truck Div., Clark Equipment Co.)

For free copy circle No. 19 on postcard

Reference Table

A wall chart of conversion factors is available. Included are common conversions, such as in. to cm, as well as conversions that are hard to find in reference manuals. (Precision Equipment Co.)

For free copy circle No. 20 on postcard

Air Safety Studies

Utilizing a high-speed translator and editor system for air safety studies is reported in an illustrated, four-page brochure. The system edits data and compresses it into useful digital data for introduction into a computer. (Consolidated Electrodynamics Corp.)

For free copy circle No. 21 on postcard

Gas Generators

A full description and operation of reversible endothermic gas generators is detailed in a catalog section. Important advantages are offered by the equipment to commercial heat treaters and heat-treating departments using controlled endothermic gas atmospheres in furnaces. (Rolock Inc.)

For free copy circle No. 22 on postcard

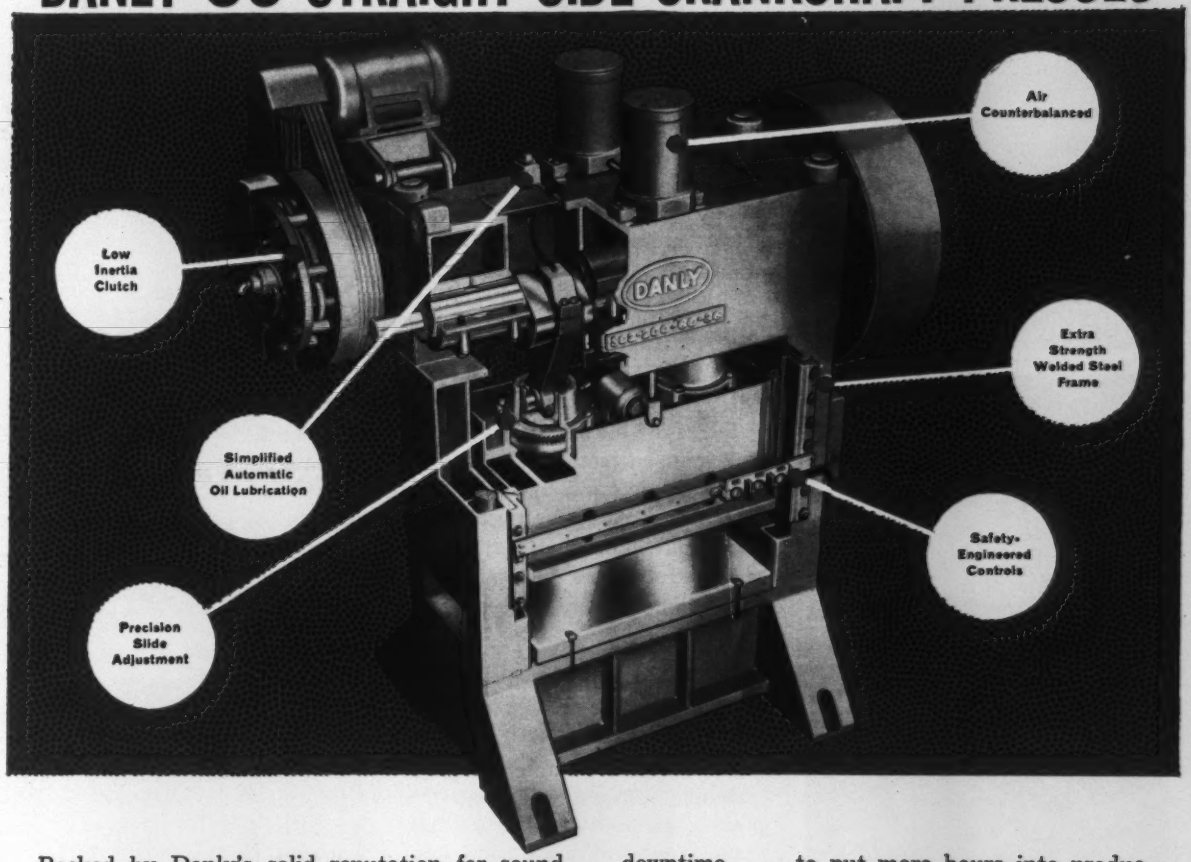
Versatile Fasteners

A brochure provides design engineers with information on a new line of self-retaining assembly fasteners. Custom designed and general-purpose fasteners are covered. (Robbin Products Co.)

For free copy circle No. 23 on postcard

MMT-PE

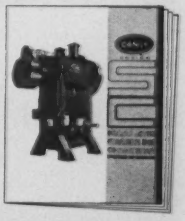
YOU GET STANDARD-DESIGN ECONOMY, CUSTOM-BUILT FEATURES WITH DANLY SC STRAIGHT SIDE CRANKSHAFT PRESSES



Backed by Danly's solid reputation for sound design and quality construction, Danly Series SC Presses offer pre-engineered, standardized design, to assure economy for general stamping work. At the same time, they offer outstanding features normally found only on custom-built presses.

Like all Danly Presses, the SC's have husky, rigid frames, to deliver accurate die closure with minimum deflection . . . which means longer die life. Automatically lubricated, quiet, smooth-running drive guarantees longer press life. Every detail of the Danly SC line has been engineered to shrink downtime . . . to put more hours into production time.

Series SC Presses are available in capacities from 50 to 300 tons. Roll feeds and variable speed drives are available for completely automatic, high-production operation.



WRITE FOR NEW CATALOG. Gives full details on Danly low-maintenance, air-friction clutch, and other features. Lists full specifications. Ask for Bulletin SC.

DANLY

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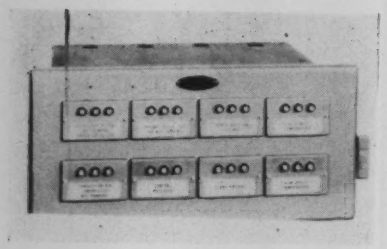
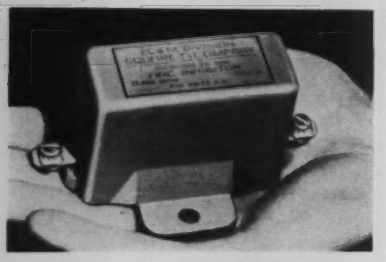
New Materials and Components



Sequential Annuciator Identifies Off-Normals

A digital, annunciator instantly identifies the sequence in which a group of alarms occurs. The device handles any number of total alarm points. Three variations are available whereby up to 7, 15, or 31 off-normal points may be sequentially identified, with resolution between points in milliseconds. The device is valuable in monitoring complex industrial processes where one or more factors can cause automatic shutdown. (Panellit, Inc.)

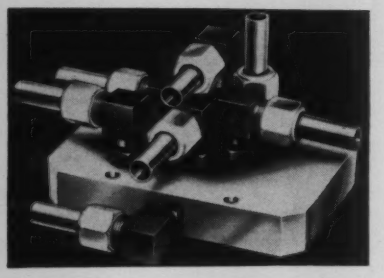
For more data circle No. 24 on postcard, p. 129



Arc Inhibitor Holds Voltage Rise in Safe Limits

Increasing the service life of control circuit contacts, an arc inhibitor suppresses arcs and absorbs voltage surges, to keep voltage rise within safe limits. Certain dc-crane and mill controllers use these inhibitors. The inhibitors are recommended for 115-and 235-v dc inductive circuits, and are easily connected in parallel across the coil terminals of magnetic contactors. Vital components are set in an epoxy resin for protection. (Square D Co.)

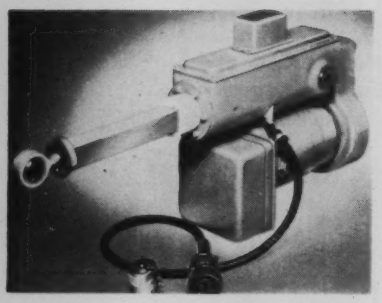
For more data circle No. 25 on postcard, p. 129



Hydraulic Fitting Makes Positive Seal

Requiring no swing clearance, a hydraulic, self-seat fitting insures a positive metal-to-metal seal. Consisting of straight thread and a stem and body with a floating nut, the fitting fits in the most confined spaces. Main features are: simple installation without special tools, and positive leakproof seal without "O" rings or special seat preparation. The fitting is available in sizes from ½ to 2 in. O.D. and in all conventional shapes, for use in hydraulic, pneumatic, and other fluid systems. (Flodar Corp.)

For more data circle No. 26 on postcard, p. 129



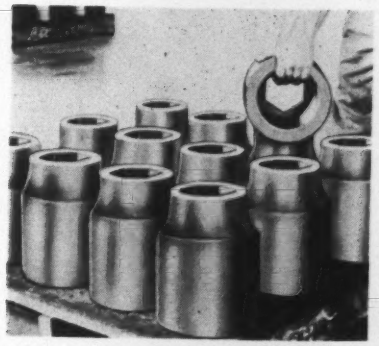
Actuator Requires No Auxiliary Equipment

Designed for industrial use, a heavy - duty, electrically - driven, linear actuator is capable of moving up to ¾ of a ton and can hold 1½ tons. This precise, rugged actuator, suitable for use wherever open-loop positioning is required, employs a brake to reduce overcoast to a minimum. The stroke is continuously adjustable from 4.25 to 5.25 in. A self-contained unit, it is powered by a single-phase 115-v, 60-cycle motor capable of developing 0.14 hp at 5000 rpm. The unit requires only line current for instant operation. A shorter stroke model is also available. (Lear, Inc.)

For more data circle No. 27 on postcard, p. 129

For Close Bolting

Adapted to applications where close bolting is required, a new line of large hexagon socket-head cap nuts and bolts are forged and highly resistant to fatigue, shock and torsion. The internal socket-head



wrenching feature permits a compact design and allows large nuts and bolts to be positioned closer to any corner, shoulder or pocket than possible with externally wrenched nuts and bolts. (Jos. Dyson & Sons, Inc.)

For more data circle No. 28 on postcard, p. 129

Voltage Regulator

Containing no moving parts or contacts to wear or break, a new transistorized voltage regulator is designed for use on constant-speed

alternators rated to 480 v 50-60 cycles. While costing no more than highly complicated mechanical regulators, the unit functions in the sensitivity range of ± 1 pct. (Lake Shore Electric Corp.)

For more data circle No. 29 on postcard, p. 129

Magnetic Tapes

Tape speed accuracy can now be determined for speeds ranging from 1⅞ to 60 ipm. A simple strobe light checks speeds up to 60 ipm. Instruction sheets include charts for measurement of tape speed errors as small as ½ second in 30 minutes. (Scott Instrument Labs, Inc.)

For more data circle No. 30 on postcard, p. 129

Hour Meters

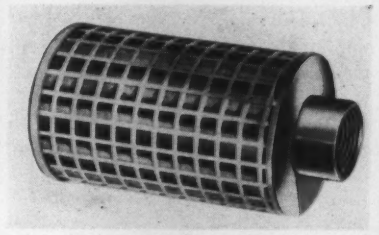
A quick glance tells, in hours and minutes, the cumulative operating time of any machine, tool or equipment run with 120 to 480 v ac. The hour meters have a sealed mechanism designed to withstand operational shocks or vibrations, as well as to exclude ambient dirt or mois-

ture. Available in 2½- and 3½-in. diameters, the meters have black Bakelite cases with 9.94-in. overall length. (Hobbs Div., Stewart-Warner Corp.)

For more data circle No. 31 on postcard, p. 129

Hydraulic Filter

A new wire-cloth hydraulic suction filter has high-flow capacity and negligible pressure drop. Filter has involute design of wire-cloth filter element to give extra-large filtering area. It eliminates troubles caused by dirty oil in hydraulic systems. The



unit filters out dirt, grit, pipe scale and other impurities that cause pump and valve failures, scored cylinders and overheating. (Arrow Tools, Inc.)

For more data circle No. 32 on postcard, p. 129

Portable Scale Truck

Incorporating a scale as an integral part of a hydraulic footlift truck enables commodities to be

"the HITCHINER way..."

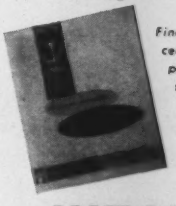
...and non-machinable super alloys in INVESTMENT CASTING

These spray nozzles for highway striping paint sprayers were formerly machined out of cold rolled bar stock. When ordinary paint was used, these nozzles functioned satisfactorily. However, when ground glass was added to the paint for reflecting purposes excessive wear caused frequent replacement.

By "the HITCHINER way . . .", we were able to engineer the manufacture of this part by investment casting in a non-machinable type alloy exhibiting a very high degree of resistance to both wear and corrosion.

This change of alloy, which eliminated the need for frequent nozzle replacement, was made possible through investment casting because the required close dimensional tolerances and detail could be cast to size.

Through the wide freedom of choice in alloy, as well as through flexibility in design and the elimination of expensive machining operations, investment casting may possibly solve your metal parts manufacturing problems. Send us your sample or blueprint and find out with a Hitchiner "engineered quotation" — no obligation.



Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure on the latest investment casting methods.

HITCHINER
MANUFACTURING COMPANY INC.
MILFORD 30, NEW HAMPSHIRE

Coast to Coast Engineering Representatives

ARMCO SPECIAL STEELS— LOW-COST ANSWERS TO

Wanted: Resistance to heat
Answer: Armco ALUMINIZED STEEL Type 1

This 40-foot refuse burner, lined with Armco ALUMINIZED STEEL Type 1, resists searing heat from burning wood chips and corn stalks. Makers of industrial incinerators and popular back-yard burners specify this special hot-dipped aluminum-coated steel because it greatly outlasts cold-rolled or galvanized steel in this punishing service.

For the same reasons, ALUMINIZED STEEL is widely used in mufflers, oven and furnace parts, and similar applications where combinations of heat and corrosion shorten life of other materials. This versatile steel is also specified for its combination of strength and heat-reflectivity in appliances, restaurant equipment, and related products.

Wanted: Top-quality porcelain enamel finish
Answer: Armco Enameling Iron

Bathtubs are drawn to a depth of 14 inches in one operation from ductile sheets of Armco Enameling Iron. Rejects stay low because this special metal is made for top performance in fabrication.

On the "firing line," too, Armco Enameling Iron minimizes defects. Freedom from impurities and resistance to sag help assure porcelain enamel products with flawless finish and close tolerances.

Summed up, "It's made *only* for porcelain enameling." That's why manufacturers of appliances, metal curtain walls, signs, and many other products specify Armco Enameling Iron for top-quality porcelain enamel finishes.

ARMCO STEEL CORPORATION, 1270 Curtis Street, Middletown, Ohio

Send me information on the following Armco Special Steels:

_____

_____

Name_____

Company_____

Street_____

City_____ Zone____ State_____

Besides the grades described, Armco produces a wide range of other special steels for better products at lower cost. These include

Armco ALUMINIZED STEEL Type 2

Armco ZINCGRIP PAINTGRIP® Steel

Armco High Strength Steel

Armco Stainless Steels (Standard and special grades in sheets, strip, plates, bars and wire)

Armco Electrical Steels

Armco Welded Steel Tubing

New steels are born at Armco

PRODUCT-PROBLEMS

Wanted: Rust-resistance, simplified production
Answer: Armco ZINCGRIP Steel

Replacement of die castings with Armco ZINCGRIP® Steel pays off four ways for a manufacturer of pressure tank air volume control valves (four center pieces in photo).

Assembly goes fast. Originally, two die-castings, diaphragm between them, were joined by bolts. Now halves are formed from ZINCGRIP Steel, diaphragm inserted, and halves joined by a reverse lockseam. *Design is simplified,* also. One valve of ZINCGRIP replaces four die-cast models. Though easier to assemble, it *costs less* and *performs better.*

Many manufacturers gain similar benefits with Armco ZINCGRIP — the rust-resisting steel that can be severely worked without flaking or peeling of its tight zinc coating.

Wanted: Economical bright-finish strip
Answer: Molding Quality Armco 17 Stainless

Three coins are easily mistaken for six when set on edge and mirrored in the bright Molding Quality Finish on Armco 17 (Type 430) Stainless Steel strip.

This high-luster finish is economical for product trim because it is a *mill finish.* Armco 17 strip is first rolled to precise thickness, then bright-annealed. In final tempering, special rolls impart the unique mirror-like quality of Armco's Molding Quality Finish.

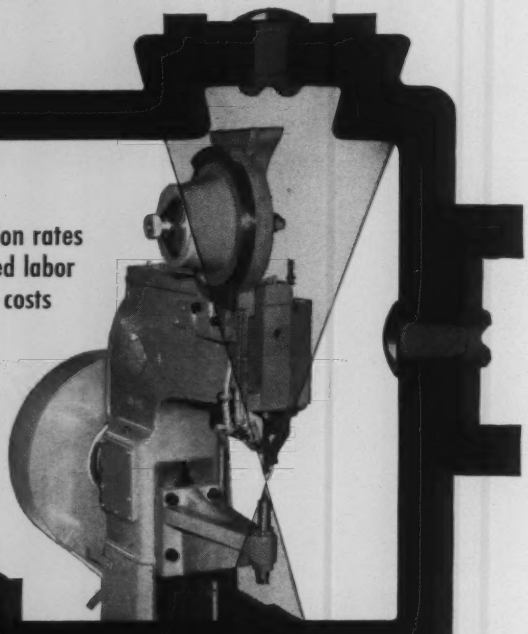
On many formed items, the brightness of Armco Molding Quality Finish minimizes costly buffing. In addition, economical Armco 17 Stainless strip is easy to color-match with other trim materials.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Odd shapes are no problem for the new Townsend Model 75 Tubular Rivet Setting Machine

High production rates using unskilled labor cut fastening costs



Skillfully designed tooling gives complete versatility to the new Townsend Model 75 Tubular Rivet Setting Machine. A variety of specialized tooling is available to equip the Townsend machines for any size and shape of work.

Townsend tubular rivets are available in steel, aluminum, copper, brass, nickel-silver and special materials for use in joining anything from cloth to steel sheets. Thus, Townsend makes available the economies of tubular rivet fastening for a wide range of products in a number of different materials. Townsend's experienced fastening engineers provide application design service.

If you wish to enjoy the economies of fastening with tubular rivets, write for complete information on the versatile Model 75 Setting Machine and the complete line of Townsend tubular rivets. Townsend Company, P. O. Box 71-B, Ellwood City, Pa.

Townsend Company

ESTABLISHED 1854

Engineered Fasteners Division

ELLWOOD CITY · PENNSYLVANIA

Cherry Rivet Division · Santa Ana, California

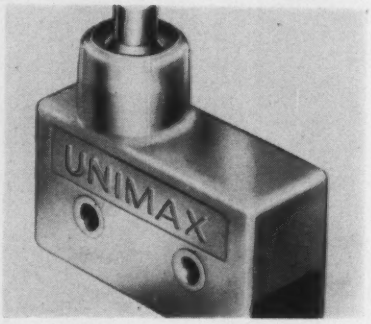
In Canada: *Parmenter & Bulloch Manufacturing Company, Limited, Gananoque, Ontario*

moved and weighed at the same time. The hydraulic footlift truck has special lifting angles to hold the scale. Each truck is adapted to suit the design and capacity of the scale to be used. (Lewis-Shepard Products, Inc.)

For more data circle No. 33 on postcard, p. 129

Double-Break Switch

Split-contact construction of an enclosed snap-acting precision switch combines versatility in circuit control with a high safety factor in heavy-duty dc circuits. It can be wired as a single-pole



double-throw switch with series contacts that break each circuit in two places at once. It can also provide single-pole, double-throw, double-break action in two separate circuits operating alternately. (Unimax Switch Div., The W. L. Maxson Corp.)

For more data circle No. 34 on postcard, p. 129

Hydraulic Cylinders

Single-acting hydraulic cylinders range in size from 4 to 18 in. in diam, length to suit customer, and have capacities up to 75,000 lb. Featuring high horizontal stability, the cylinders are available in operating pressures up to 500 psi. A top-bolt ring for attachment to the working surface is standard equipment. (The Joyce-Cridland Co.)

For more data circle No. 35 on postcard, p. 129

Metalized Ceramic

Metalizing of ceramic, glass, and mica prepares an electronic component for permanent bonding to metal through production solder-

ing or brazing methods. The components offer conductive coatings of silver and platinum with electroplated coatings of copper, nickel, silver and tin. Components include both steatite and alumina ceramics in tubes, plate rods, and custom shapes. The components are used in electronic devices. (Metalizing Industries Inc.)

For more data circle No. 36 on postcard, p. 129

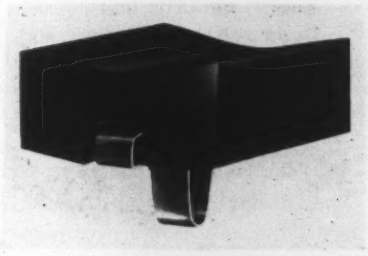
Solder Rings

A line of precision silver-solder rings can be used for high speed soldering at temperatures ranging from 1150° to 1800°F. The rings come with an overlap, a gap, or with ends butted in diameters from 0.003 to 0.375 in., and with an almost unlimited range of inside diameters. Consisting of a silver-solder alloy, the high-temperature joining rings speed automation. (Alloys Unlimited, Inc.)

For more data circle No. 37 on postcard, p. 129

Bumper Clips

Available in two basic designs, rubber bumper clips are suitable for static and dynamic applications. Specific uses include: self-leveling feet, tapered feet, utility bumpers,



shock mounts and bantam bumpers. All clip bumpers come fully assembled; ready for installation. (Industrial Rubber Div., Cooper Tire & Rubber Co.)

For more data circle No. 38 on postcard, p. 129

Noise-Free Lights

Fluorescent-light fixtures reduce radiated and conducted radio interference from fluorescent lights. The fixture makes use of standard fluorescent lamps mounted within electrically-shielded enclosures. A heat-resistant, borosilicate glass lens, one side of which is permanently

Choice of the wise buyer who compares...

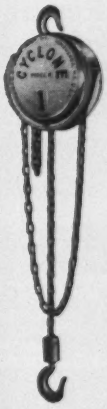
CM HOISTS

CM METEOR ELECTRIC WIRE ROPE HOIST ½ to 5 ton capacities—Compact, enclosed design. Low headroom. Continuous duty motor with thermal overload protection for heavy duty service. Precision bearings and helical gears for long life. Only 110 volts at push button control. Hook suspension; plain, geared or motor driven trolley.

CM LODESTAR ELECTRIC CHAIN HOIST—⅛ to 2 ton capacities—First truly heavy duty version of small electric hoist. ¼ ton model weighs only 51 lbs. Heavy duty self-adjusting brake, plus exclusive regenerative electrical braking. Upper-lower safety limit switches. CM-Alloy load chain. Single and three phase.

HAND OR ELECTRIC CHAIN OR WIRE ROPE
CM makes them all! So you can choose a hoist that's perfectly suited to your specific needs in a compact, rugged and safe CM design.

CM TROLLEYS AND CRANES



CM CYCLONE Hand Chain Hoist—¼ to 10 ton capacities—Easy to carry. One ton model weighs only 36 pounds. Made of tough aluminum alloy. CM-Alloy load chain. High efficiency. Lifetime lubrication.

CM PULLER—"The One Man Gang"—¾ to 6 ton capacities—Lifts or pulls at any angle. Lever handle operation Automatic load brake holds at any point. ¾ ton model weighs only 13 pounds and fits in a tool box. CM-Alloy load chain.

● **FOR OVER 75 YEARS,** Chisholm-Moore has offered hoist buyers the newest and most efficient designs, the most rugged construction, and the greatest number of valuable operating and safety features. CM hoists operate with a very minimum of maintenance. They give years of satisfying service.

Request catalog and name of local stocking distributor.

CM HOISTS

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK
REGIONAL OFFICES: NEW YORK, CHICAGO, CLEVELAND

In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO

FORMULA FOR TOMORROW

MTE

THE MACHINE TOOL EXPOSITION - 1960

INTERNATIONAL AMPHITHEATRE

CHICAGO, ILLINOIS

SEPTEMBER 6-16

MTE

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION

MMT-PE

MTE

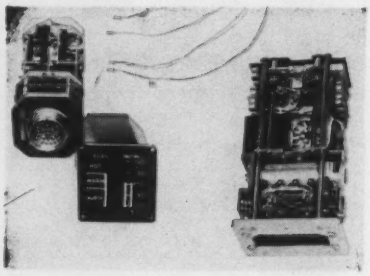
DESIGN DIGEST

bonded with a light, transparent, electrically-conductive film, shields the enclosure. Radiated interference in the frequency range of 0.014 to 25.0 megacycles, and conducted interference is eliminated. (Acoustica Associates)

For more data circle No. 39 on postcard, p. 129

Indicating System

Weighing a maximum of only 3.85 lb, a transistorized temperature indicating system has an accuracy of ±5°F. Requiring only 2⅜ in. panel space, it does the work of four indicating systems. Operating temperature range is



—65° to +160°F. The unit is designed for monitoring temperatures of any military or commercial electronic system. The unit consists of 4 developed sensing devices, a computor package and an indicator package. (John Oster Mfg. Co.)

For more data circle No. 40 on postcard, p. 129

Cupro Nickel Tubes

Specially processed 70/30 cupro nickel tubes exhibit improved high-temperature strength characteristics over those of standard 70/30 cupro nickel. Both the yield and the tensile strengths are up more than 30 pct. Useful operating range of the high yield cupro nickel has been extended to 750°F. At this temperature the maximum allowable design stress value almost equals that of Monel. (Bridgeport Brass Co.)

For more data circle No. 41 on postcard, p. 129

Low-Density Filler

A resin-compatible, filler features a low density of 4 lb per cu ft, 2300°F melting point, good float-

ability, white color, 300- to 600-micron size, and low cost. Used either alone or with binders, the filler is suitable as a material in insulation, mold reinforcement, marine flotation, building panel, roofing, adhesive, machineable casting, and refractory applications. (Hastings Plastics, Inc.)

For more data circle No. 42 on postcard, p. 129

Check Valves

Two new valves have been added to a line of hydraulic check valves for 3000 psi operating pressure. The valves are for in-line mounting, with internal pipe thread connecting port in one end and triple-lock machining on the other end for J.I.C. flared-tube connection. (Parker-Hannifin Corp.)

For more data circle No. 43 on postcard, p. 129

Ball Bearings

Two new series of inch-and metric-dimension ball bearings are offered, either open or shielded. One series has inch dimensions for bore, outside diameter and width.

no matter what the two metals are . . .

now you can **SOLDER** them

PROBLEM:
Joining copper pipes in extremely hard water area. Lead solders made porous joints. Heat required for high temperature solders burned copper pipes.

SOLUTION:
All-State's #430, a silver-bearing solder which flows at 430F, made perfect, permanent joints, solved the problem.

ALL-STATE has a solder for joining any commercial metal or alloy to any other . . . in one or more temperature ranges. For typical examples, see tables below:

400°F-500°F							700°F-800°F					
Al.	Copper	Brass	Steel	S.S.	Nickel		Al.	Copper	Brass	Steel	S.S.	Nickel
37	107	107	107	107	107	Aluminum	56	105	105	105	105	105
107	430	430	430	430	430	Copper	105	105	105	105	105	105
107	430	430	430	430	430	Brass	105	105	105	105	105	105
107	430	430	430	430	430	Steel	105	105	105	105	105	105
107	430	430	430	430	430	Stain. Steel	105	105	105	105	105	105
107	430	430	430	430	430	Nickel	105	105	105	105	105	105

Reference numbers above indicate All-State solder to be used for joining metals.

A set of four complete tables, covering temperature ranges from 400F to 800F, is yours for the asking. Send for free Instruction Manual, too.

Distributor-Stocked, convenient to buy. Economical to use.
ALL-STATE WELDING ALLOYS CO., INC., White Plains, N. Y.
Call WHite Plains 8-4646 or write for nearest distributor

***Less* shrinkage...*greater* load capacity...**

under *higher* heat load!

DRAGON BRAND semi-silica brick

Hot Load Test: Dragon Brand Semi-Silica brick have *no* deformation in hot load test at 2460° F. Special load tests at 2640° F. show Dragon Brand deformation of only 0.7%—proof of high strength and deformation resistance under load at high temperatures! Dragon Brand assures longer life *without vitrification or shrinkage*—even at high temperature limits!

Specifications: High fusion point (Cone 28-29, 3000° F.); Modulus of Rupture, 350-450 psi; Cold Crushing Strength, 2000-2050 psi; Bulk Density, 118-120 lbs. per cu. ft.

For less hot-load sag...less spalling loss...less slag penetration...DRAGON BRAND high quality semi-silica brick!

Denver Fire Clay Company

3033 Blake Street—MAin 3-7177

DENVER • SALT LAKE CITY • NEW YORK

The DENVER FIRE CLAY COMPANY DFO-7
3033 Blake Street, Denver 17, Colorado

Please send me further information on your full line of Industrial Refractories.

Name.....

Company.....

Address.....

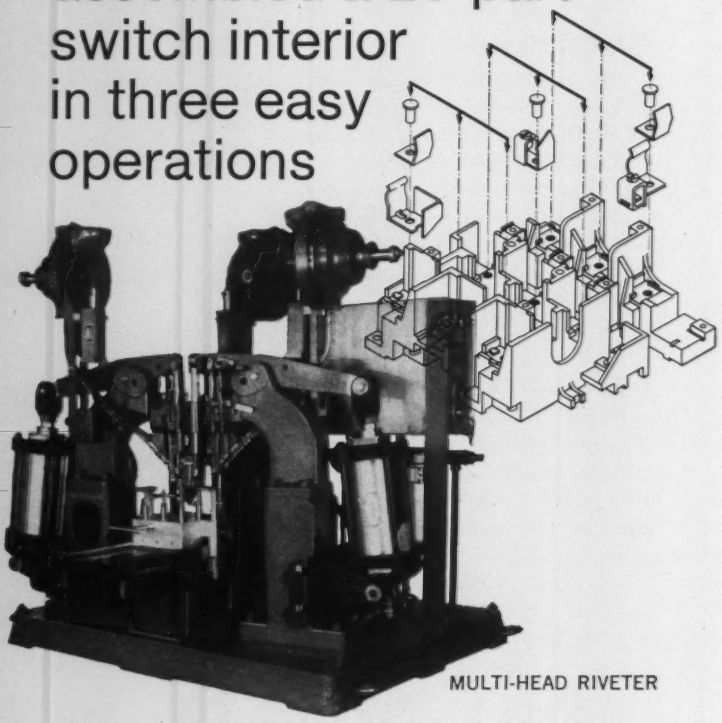
City and State.....

BOTH MADE ASSEMBLY MORE AUTOMATIC

with the help of **TRS PAR PROCESS** riveting engineers

GENERAL ELECTRIC

assembled a 25-part switch interior in three easy operations



MULTI-HEAD RIVETER

Assembling interior components of the new G.E. Safety Switch required nine riveting operations, fastening twenty-four components to a complex molded base. Engineers from G.E. and TRS worked together in planning the assembly steps and in designing this Multi-Head Riveter to accomplish them. All components are loaded on a TRS-designed fixture which is equipped with a cam-operated hold-down and a 3-position stop mechanism. Sliding the loaded fixture forward to the first stop, the riveter is tripped to set three rivets at one time. At the second and third stops, two more groups of three rivets are set to complete the assembly. Withdrawing the fixture causes the hold-down to open, permitting removal of the work.

TRS

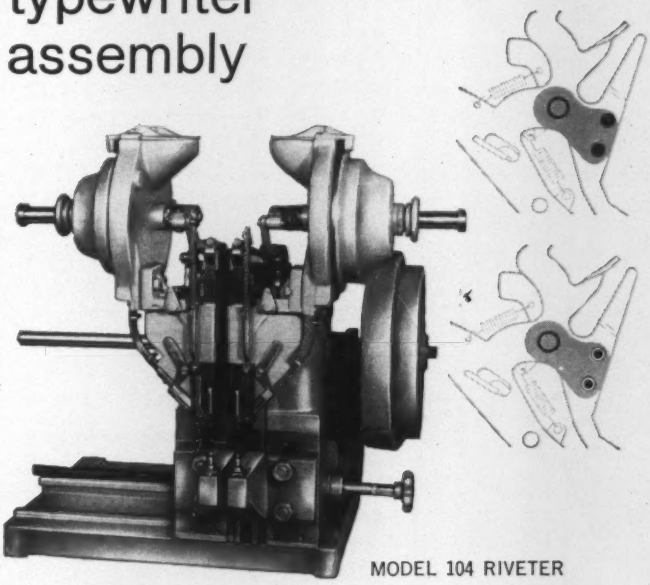
TUBULAR RIVET & STUD COMPANY

Quincy 70, Mass.

TRS SALES OFFICES: Atlanta • Buffalo • Charlotte • Chicago • Cleveland Dallas • Detroit • Hartford • Indianapolis • Los Angeles • New York Philadelphia • Pittsfield • Quincy • St. Louis • Seattle.

WAREHOUSE IN CHICAGO See "Yellow Pages" for phone numbers

ROYAL McBEE saved almost $20,000 in their Royal Electric typewriter assembly



MODEL 104 RIVETER

Original production plans called for the use of solid rivets and a spinning machine, to put together a subassembly for the Royal Electric typewriter. Countersunk holes were required. Also, transferring the loose assembly to the fastening position offered many opportunities for scrap-making fumbles. The TRS engineer suggested replacing the solid rivets with semi-tubular rivets, not requiring countersunk holes, and automatically fed and set with standard TRS Model 104 riveters. A special loading fixture was designed by TRS, to receive the components and remove any chance of fumbles. Within a relatively short period of time, almost $20,000 was saved through a marked increase in production efficiency plus the virtual elimination of rejects.

FIND OUT what TRS PAR PROCESS can save you!

PAR stands for **P**roduction **A**utomated **R**iveting. It is the process through which TRS applies Automation to assembly by integrating and making more automatic operations like:—

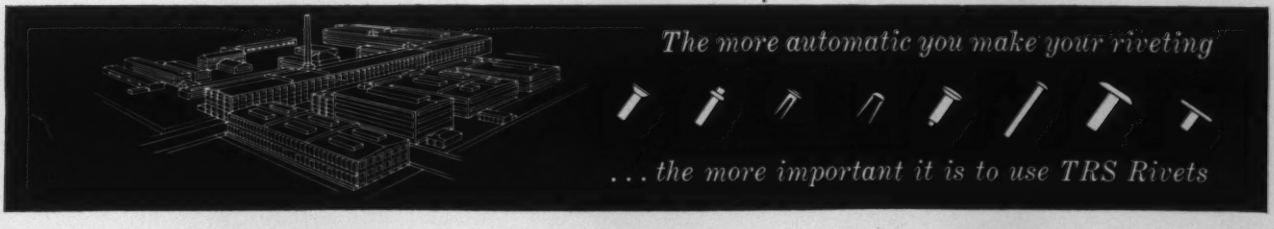
1. FEEDING of tubular rivets or related products.
2. TRANSFER of parts to — or between — riveter stations.
3. SEQUENCING from 3 to 15 rivet setters to operate simultaneously or in any desired order.
4. CONTROL of setting force as required by parts thickness or material characteristics.
5. SENSING of improper conditions and stopping equipment to avoid injury to parts, equipment, or operator.
6. EJECTION of parts as required.

To design the integrated system of standard or multi-head riveters, feeders, transfers and controls required by the TRS PAR Process demands the special knowledge and experience which TRS possesses in greatest measure.

TRS not only originated tubular rivets, but also the revolutionary multi-head riveter which opened up new possibilities for automating the riveting process.

Invite a **TRS** Engineer to Check Your Assembly Operations

If your product can be riveted, and especially if several rivets are involved, it's practically certain that TRS can help you increase production rates, save on direct labor charges, decrease parts spoilage and machine down time. To investigate, just write or phone the nearest TRS office.



PETERSON
STEELS, INC.
THE 52100 HOUSE
UNION, NEW JERSEY · WETHERSFIELD, CONNECTICUT
DETROIT, MICHIGAN · MELROSE PARK, ILLINOIS

These bearings are available with shaft sizes from ⅛ to 1½ in. The other series is made to metric boundary dimensions with bore sizes ranging from 4 to 9 millimeters. (Hoover Ball & Bearing Co.)

For more data circle No. 44 on postcard, p. 129

Mercury Lamps

Available for nearly 100 different models and sizes of blueprint and whiteprint machines, rebuilt mercury lamps combine the advantages of a 120-day operating guarantee with prices from 40 to 20 pct less than the cost of new lamps. Lamp design provides special processing techniques which eliminate internal metallic deposits that formerly caused shadows and printing irregularities. (PEK Labs, Inc.)

For more data circle No. 45 on postcard, p. 129

Expansion Joints

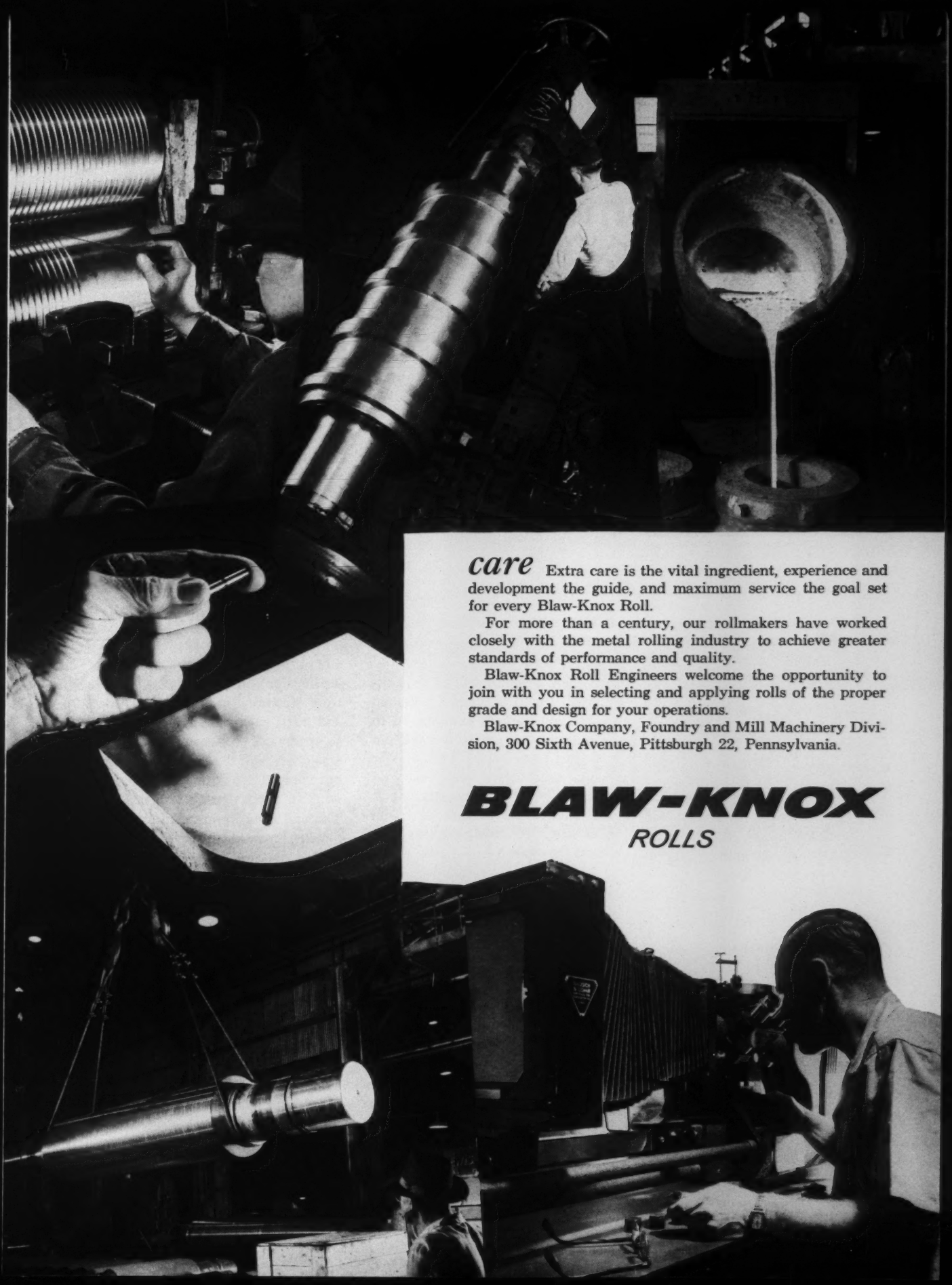
A new weather-resistant expansion joint eliminates cracking in the seams of terrazzo tile and concrete flooring. It's composed of a synthetic rubber compound bonded between strips of durable zinc. The new product can be used on terraces, shopping center plazas or even on rough-usage industrial storage areas. (Firestone Rubber & Latex Products Co.)

For more data circle No. 46 on postcard, p. 129

Resistance Coating

An economy Neoprene-asphaltic coating resists weathering, moisture, and mild chemical service. Characteristics of the coating are: no primer required, will apply to damp surfaces, retains flexibility, and will not crack in cold temperatures. Some of its applications are, coating of underground pipes and tanks, moisture barriers, pipe exteriors, sealing or renewing old roof structures, exterior structural steel, and ship hatches. The coating can be applied by brush, roller coat or spray. (Gates Engineering Co.)

For more data circle No. 47 on postcard, p. 129



care Extra care is the vital ingredient, experience and development the guide, and maximum service the goal set for every Blaw-Knox Roll.

For more than a century, our rollmakers have worked closely with the metal rolling industry to achieve greater standards of performance and quality.

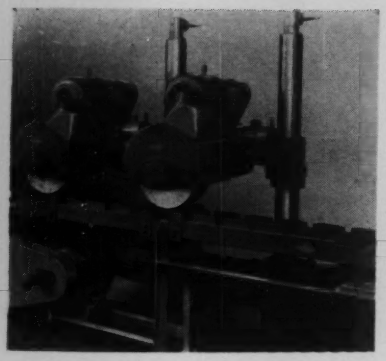
Blaw-Knox Roll Engineers welcome the opportunity to join with you in selecting and applying rolls of the proper grade and design for your operations.

Blaw-Knox Company, Foundry and Mill Machinery Division, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

BLAW-KNOX

ROLLS

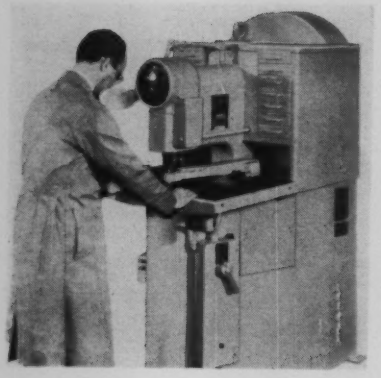
New Equipment and Machinery



Polishing Machine Gives Low-Cost Finishing

A straight-line polishing and buffing machine provides economical finishing functions for high-production, light-duty operations. Adjustable lathes may be positioned around the machine for tangent or wide-wheel, cross-cut buffing operations; attachments can be applied for polishing-type operations for various deburring and blend purposes. The machine consists of a 10-in. wide, 8-ft long conveyor unit and adjustable lathes for buffing operations. The conveyor has a chain-type drive and platens to carry work-holding fixtures. A ¾-hp motor, driving the conveyor through a variable-speed drive, permits conveyor speeds from 10 to 30 fpm with load and unload at one end. (Acme Mfg. Co.)

For more data circle No. 50 on postcard, p. 129



Fabricator Punches, Notches Prototype Work

Designed for prototype work, a machine punches, notches, and nibbles sheet material. The fabricator punches round or shaped holes up to 3½ in. diam in material up to ¼-in. mild steel. It has a maximum notching capacity of 5 x 5 in. in ⅛-in. mild steel, and can do straight line or contour shearing at 165 strokes per minute in ⅛-in. mild steel. A single toggle switch effects the change from single stroke punching to 165-strokes per minute nibbling. Employed for short or medium production runs, the fabricator features multiple-stop, side and back gaging, and incorporates a system of self-stripping punch assemblies and die buttons that can be changed from one size to another in approximately 20 seconds. The unit is easily installed & maintained. (Wales-Strippit, Inc.)

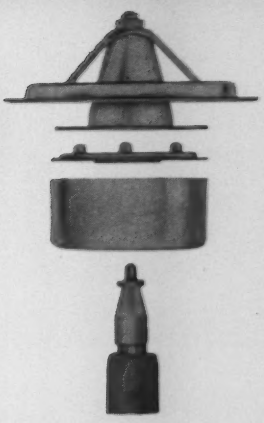
For more data circle No. 51 on postcard, p. 129

Induction Heater Gives Uniform Surface Heating

A high-speed, induction heating unit hardens, tempers, and anneals tool-steel parts. Readily adaptable to other heating and bonding operations, the unit has simple, compact design. The unit features the heater stations and power generator comprised in a single unit, and push-button controls which permit non-technical operators to obtain exact surface heating patterns without distortion, decarburization, or excessive oxidation. Measuring 5 ft in width, 3 ft in depth, and 6 ft 9 in. in height, the heating unit incorporates controls and instruments mounted on an eye-level panel, with single or multiple heater stations. The high-frequency induction heater is available with 5-, 10-, 20-, 30-, and 60-kw capacities; with 3-phase, 60-cycle power supply. (C. I. Hayes, Inc.)

For more data circle No. 52 on postcard, p. 129

AGAIN-



EXPLODED VIEW OF AUTOSTAT® made by FULTON SYLPHON DIV., Robertshaw-Fulton Controls Co., shows impact extruded cup made from Revere Copper Rod. Other parts of this superior thermostat used in pressurized cooling systems in automobiles and other automotive equipment, are made of 70/30 Revere Brass Strip.

Revere helps "fit the metal to the job"

AND A LEADING MANUFACTURER OF AUTOMOTIVE THERMOSTATS IS ABLE TO PRODUCE A SUPERIOR PRODUCT FOR LESS MONEY

That little unimportant-looking copper cup shown above originally posed a king-sized production problem. It is a critical part of a newly designed automotive thermostat made by the Fulton Sylphon Division of the Robertshaw-Fulton Controls Co., Knoxville, Tenn.

In the early stages this copper cup was machined from free cutting copper rod, but this proved costly due to the high rate of scrap from the machining operation and the relatively high cost of turning out the machined part. At this point Revere Technical Advisors got together with Fulton Sylphon Engineers and the possibility of an impact extrusion was discussed. Revere T.A.'s in turn contacted suppliers who might furnish these extrusions in copper, to see whether or not they could be produced economically and to the demanding specifications required.

After exhaustive tests it was found that the cup could be impact extruded to meet the exacting hardness specifications of Fulton Sylphon. During its development, many problems involving temper, grain size and control of the chemical composition of the copper rod had to be solved.

In addition to the Copper Cup, Revere also supplies 70/30 Brass Strip from which other parts of the AUTOSTAT® are fabricated.

Said a Fulton Sylphon purchasing agent, "When you ask Revere for help you really get results."

This is still another case of how Revere, a supplier, working with still another supplier, was able to help its customer produce a superior product for less money. Why don't you take advantage of this service?

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue

New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

it's significant that

COMMERCIAL HEAT-TREATERS

like **METALLURGICAL PROCESSING CORP.**

...are the most

ENTHUSIASTIC

operators of the NEW

ROLOCK®

CARBON POTENTIAL CONTROLLER

U. S. Patent No. 2,818,246 (Kappel)

Yes, commercial heat-treaters . . . men who depend wholly on the cost-efficiency of their equipment and the competitive high quality of their work . . . have been among the first to see the unique advantages of this entirely fresh approach to Carbon Potential Control. "The finest thing of its kind and a really practical, dependable solution to the problem." says Mr. Louis Perlman, President of Metallurgical Processing Corp. Other heat-treaters and heat-treating department heads agree. Here is a relatively simple, fully engineered system that works.

THESE OUTSTANDING ADVANTAGES CAN BE YOURS TO ENJOY, TOO!

Measures carbon potential of gas *continuously* by an entirely NEW method.

Once properly adjusted to furnaces and gas generators, the control action is precise and dependable.

Requires a minimum of attention . . . does not call for specially trained operators.

Permits far more uniform control of furnace atmospheres and hence results in more uniform, clean, high-quality work.

For further information write to the Rolock Engineering Department.

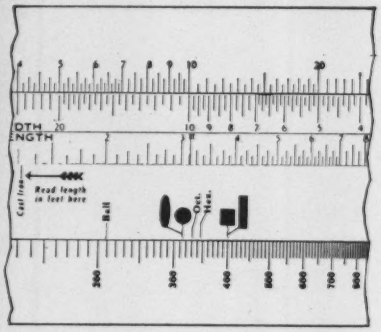
ROLOCK INC., 1362 KINGS HIGHWAY, FAIRFIELD CONN.

IRL60

NEW EQUIPMENT

Weight Slide Rule

A slide rule provides quick, easy way to figure weights of various types of materials. This easy-to-read rule has contrasting, long-wearing veri-chrome markings against an overall black field. Giv-

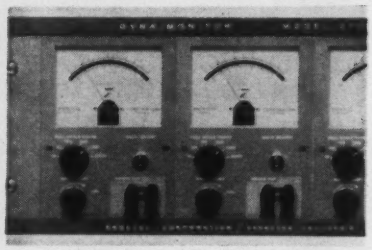


ing accuracy and dimensional stability, the rule does not warp or bind, cannot be damaged by grease and oil, and will hold up under the most severe shop use. (Novotni Slide Rule)

For more data circle No. 53 on postcard, p. 129

Monitor and Amplify

Completely integrated, a laboratory system monitors and amplifies vibration, shock, pressure and force signals. The three-channel signal system monitors the output of piezoelectric transducers or other high



impedance devices. Each amplifier section contains a voltage amplifier, a power amplifier and a meter. Output of the power amplifier is ample for driving high frequency galvanometers. (Endevco Corp.)

For more data circle No. 54 on postcard, p. 129

Sequence Timing Board

A sequence timing board can be used for actuating three stopwatches at precisely the same time with a simple squeeze of the hand that

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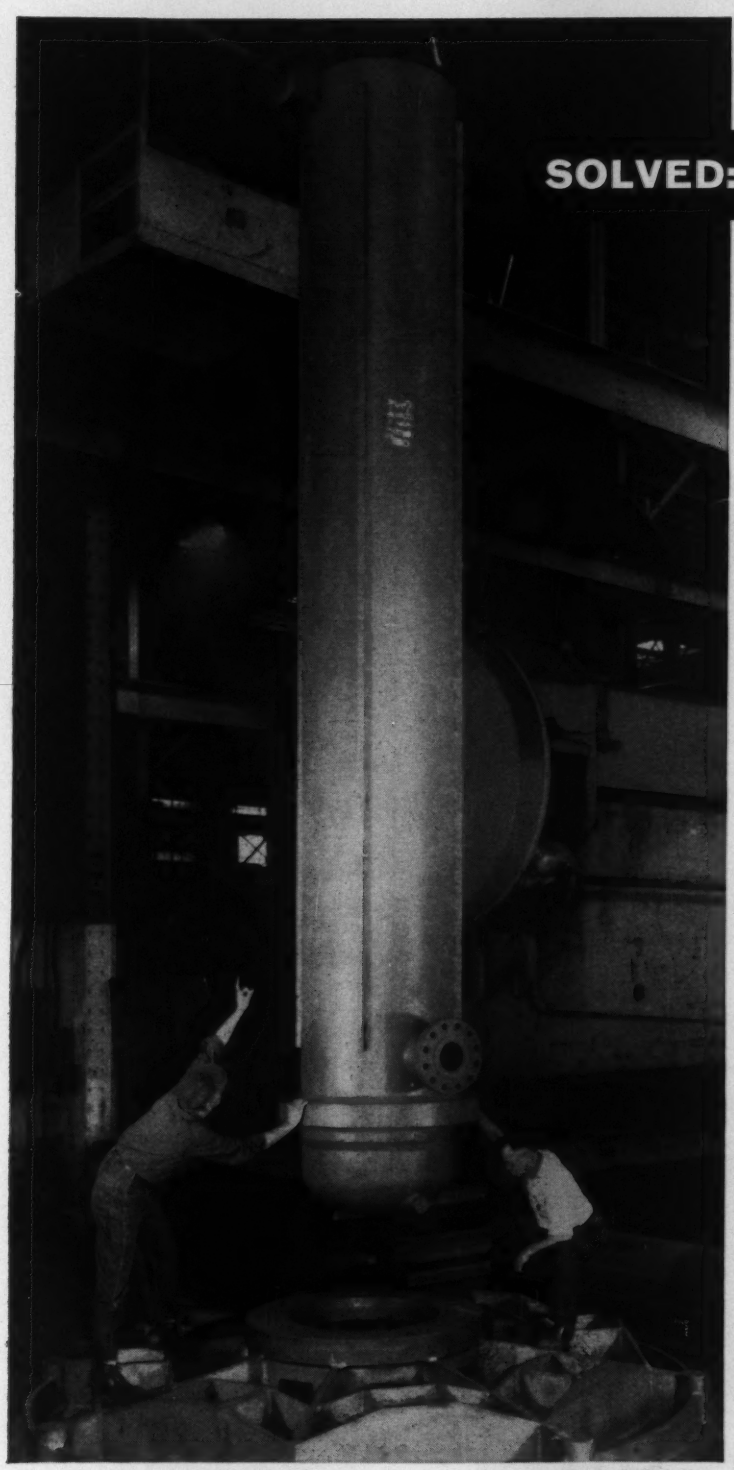

Blaw-Knox workmen assembling one of two constant pressure type accumulators built for two of America's largest steel mills. Sandusky supplied the straight cylindrical sections for both.

SOLVED: by Sandusky Centrifugal Casting

Blaw-Knox chooses 10-ton

SANDUSKY CASTING

for giant slabbing mill

When an 18½-foot cylinder was needed for a new giant Universal slabbing mill built by Blaw-Knox Company's East Chicago (Indiana) Works for a well known steel mill, they found that the most practical and economical way to meet all requirements was with a Sandusky Centrifugal Casting.

This 10-ton carbon steel cylinder, 32" O.D. with a 3½" wall, functions as an accumulator in the mill's hydraulic roll balancing system. Essentially a pressure vessel, it simultaneously supports the ram and ballast weighing 226 tons—the weight required to develop constant operating pressure of 1000 p.s.i.

"Only a dimensionally stable, one-piece cylinder could perform satisfactorily in this service," a Blaw-Knox official asserted. *"Distortion could lead to binding, loss of pressure and costly downtime. Sandusky's ability to produce this heavy walled cylinder in one 18½ foot length met all our requirements of cost, stability, and strength."*

Sandusky cylinders up to 33 feet long —from 7" to 54" O.D.— and in a wide range of ferrous and non-ferrous alloys —may well be the answer to *your cylindrical problems,* too.

Write to us at Sandusky, Ohio. Ask for latest Bulletin #200.

SANDUSKY CENTRIFUGAL CASTINGS
FOUNDRY & MACHINE CO.

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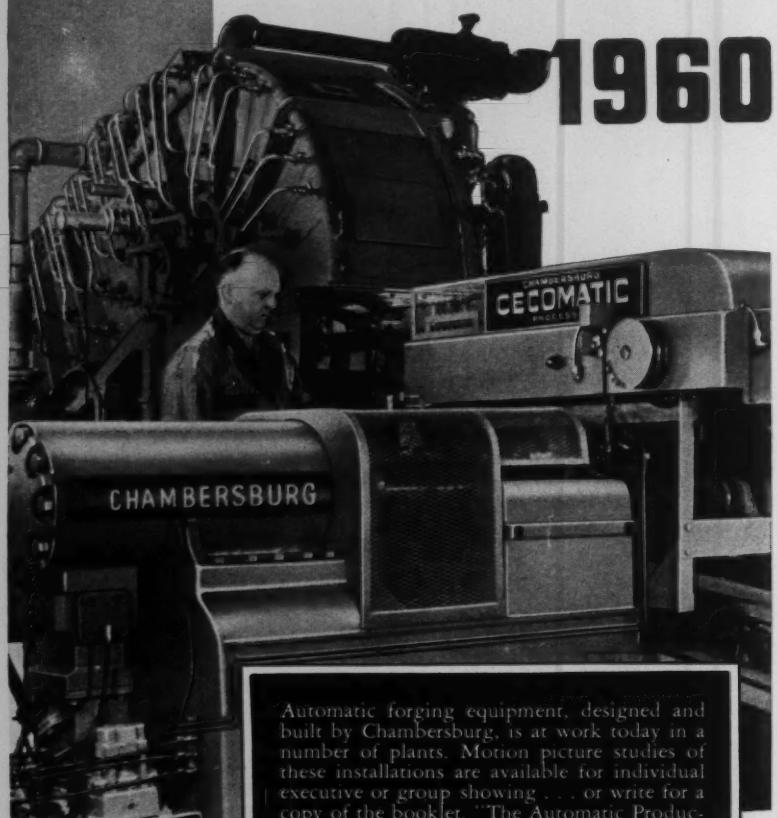
SANDUSKY, OHIO—Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

You can cut your forging costs in 1960



Automatic forging equipment, designed and built by Chambersburg, is at work today in a number of plants. Motion picture studies of these installations are available for individual executive or group showing . . . or write for a copy of the booklet, "The Automatic Production of Forgings in Closed Dies". It may help shape your forging plans for tomorrow.

CHAMBERSBURG ENGINEERING COMPANY
Chambersburg Pennsylvania

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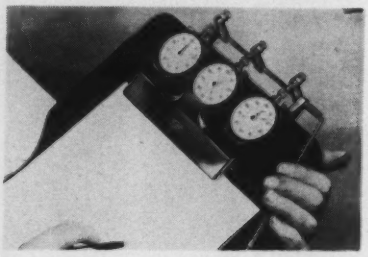
• The Hammer Builders •

DESIGNERS AND MANUFACTURERS OF THE IMPACTER

When it's a vital part, design it to be **FORGED**

carries the board. The unit times sequential steps with zero time loss between the steps, and with no necessity to read timer hands while they are in motion. This technique offers far more than convenience; it insures accuracy of data. The three stopwatches are held between

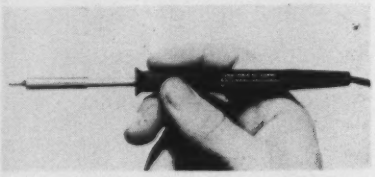


spring-loaded cradles and a common alignment plate around the stems. The actuators are knurled at the contact pad and the upper locknut. Thus, adjustments are easy, secure and independent. (Heuer Timer Corp.)

For more data circle No. 55 on postcard, p. 129

Tiny Soldering Irons

Two new 115v-ac pencil type soldering instruments are now available. Weighing only 1 oz plus cord, both models are designed for continuous production, research or service work where close quarter pre-



cision soldering is required. These two models are believed to be the first miniature soldering irons ever available for immediate plug-in without a step-down transformer. (The Oryx Co.)

For more data circle No. 56 on postcard, p. 129

Shielded-Arc Welder

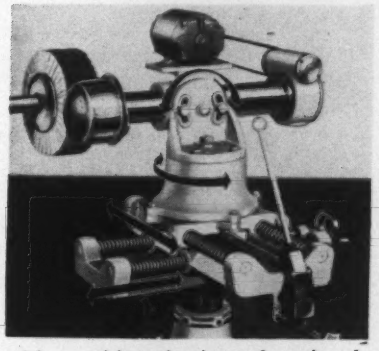
Designed for precision welding applications, a new shielded-arc welder can be used with any of the inert-gas, shielded-arc welding heads now available. It can be used manually or in automatic machines to precision weld thin metal parts such as metal bellows, stainless tubing, electron tube components, or instru-

ment parts. The welder handles both ferrous and non-ferrous alloys from approximately 0.001 to 0.025-in. thick. It's designed to operate on a continuous production-line basis. (Vacuum Tube Products Div., Hughes Aircraft Co.)

For more data circle No. 57 on postcard, p. 129

Unit Buffs and Grinds

Versatile equipment handles practically any buffing or grinding job in the average plant. A new machine consists of a standard low-cost basic pedestal and spindle unit

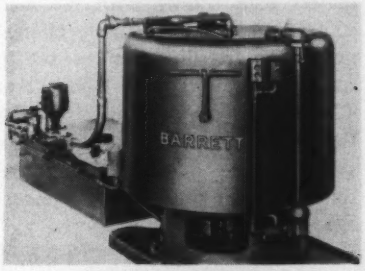


with a wide selection of optional, interchangeable components. It accommodates practically any shape workpiece. In some cases, one operator can service two or more machines. (Murray-Way Corp.)

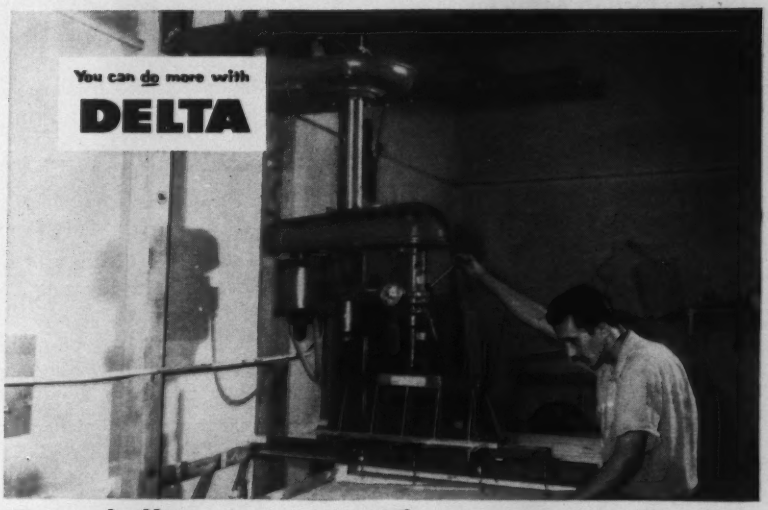
For more data circle No. 58 on postcard, p. 129

Eliminate Soaking

A new unit impregnates in minutes such parts as capacitors, armatures, yarns, electrical coils and other porous and semi-porous objects. This eliminates hours of soaking or "pumping down" in vacuum



impregnation. The impregnator utilizes centrifugal impregnation by developing a pressure variance from 100 psi at the periphery to zero at the center of the chamber. Saturants such as varnish, wax, asphalt, oil or others are pushed into the objects while air and other contaminants are



Cuts drilling costs 50%

To boost output and increase accuracy, the S & S Visual Company of Brooklyn, N.Y. suspended a standard 17" Delta drill press from an angle iron wall bracket. Use of a Commander multiple spindle drill head permits simultaneous drilling of up to 15 holes in 30" x 60" display panels. Relatively inexpensive installation cost less than $1000, quickly paid for itself by *doubling* production.

This is typical of the way rugged, versatile Delta Industrial Tools are being used in thousands of plants to supplement or replace costly single purpose machines. For free 64-page illustrated booklet of valuable cost-cutting ideas, write: Rockwell Manufacturing Company, Delta Power Tool Division, 640B N. Lexington Ave., Pittsburgh 8, Pa. In Canada, Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.

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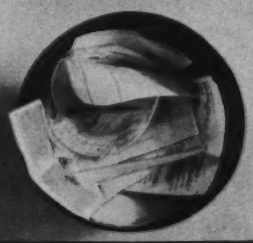

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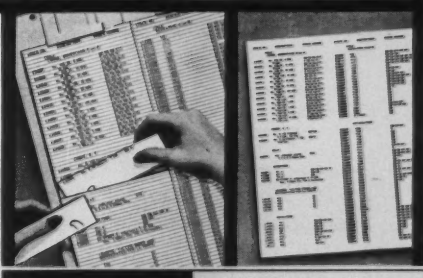

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being pushed out. Excess impregnant on the surface can be spun off, drained and saved. (The Leon J. Barrett Co.)

For more data circle No. 59 on postcard, p. 129

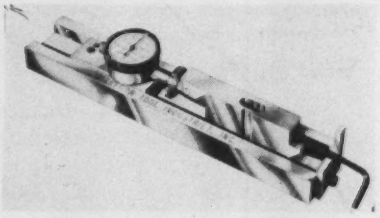
Adhesive Holds Work

A two-sided adhesive film can be used to hold work for grinding. By applying the adhesive directly to the work, a grinding machine operator can place the workpiece exactly where he wants it. The grinding surface isn't limited as it is with clamps and walls. A portable applicator enables the operator to apply the adhesive without touching it. (Interchemical Corp.)

For more data circle No. 60 on postcard, p. 129

Accurate Tool Gage

Instant, accurate readings of adjustable boring and reaming tool diameters are possible with a new gage. This gage consists of a steel holder, in which the tools are placed, and a dial-type indicator. The operator needs to measure only one tool to establish the desired size. He then places it in the holder and adjusts the indicator to zero. Each succeeding tool of the same

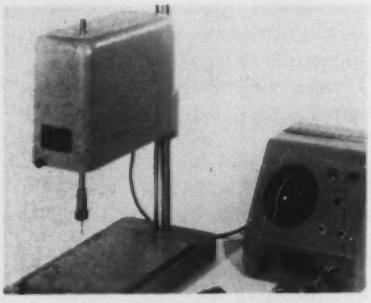


size is simply placed in the holder and adjusted to the zero reading. Thus, accurate settings can be obtained within 10 seconds per tool. (Muskegon Tool Industries, Inc.)

For more data circle No. 61 on postcard, p. 129

Automatic Tapping

An automatic tapping machine enables an unskilled operator to perform the precision tapping operations formerly entrusted only to a highly skilled machinist. The machine feeds the tap into and withdraws it from the workpiece at a rate which is controlled by a single



master lead screw. With the lead screw and a set of simple change gears, the machine can be set to tap any standard pitch from 32 to 120 threads per inch in sizes 000 through #10 with changeover from one pitch to another taking less than 2 minutes. (Milman Engineering Co., Inc.)

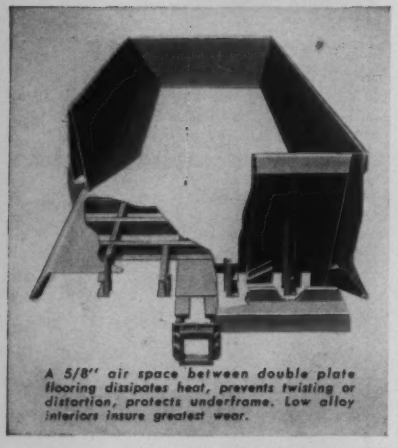
For more data circle No. 62 on postcard, p. 129

Detects Strain

A unique photoelastic device provides instantaneous visual indication of principal strain and stress directions at desired points on a test surface. This device permits complete and accurate strain direction in-

MAGOR AIR DUMP CARS

FOR STEEL PLANT SERVICE

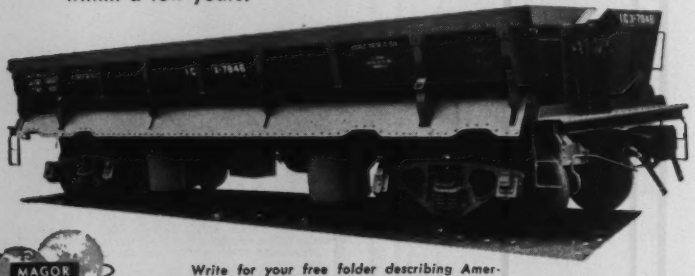


A 5/8" air space between double plate flooring dissipates heat, prevents twisting or distortion, protects underframe. Low alloy interiors insure greatest wear.

The new Magor Air Dump Car for steel plant service can cut your refuse disposal costs as much as 40%! Safe, swift, automatic dumping eliminates expensive labor and crane equipment. Low height and open type body means faster loading. Saves time, labor and haulage costs! Smooth interiors eliminate "dead load" returns!

The double-plate flooring shown here is just one of the many Magor design features that account for Magor's leadership in dump car production. Designed for the job — built to last, Magor Air Dump Cars cost less to buy — less to operate!

Savings effected by the new Magor Air Dump Cars will write off your entire dump car investment within a few years.



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STEEL-WELD FABRICATION . . .

PRECISION WELDMENTS

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The two weldments illustrated above are wind tunnel sections designed with motor mounts to house giant propellers driven by electric motors. These husky pieces are typical of thousands of Steel-Weld Fabricated parts and assemblies produced and machined by Mahon for defense contractors and manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment.

When your design calls for weldments of any kind, you, too, will want to discuss your requirements with Mahon engineers; because, in the Mahon Company you will find a unique source for weldments or welded steel in any form . . . a fully responsible source with a long and enviable performance record, and unusual facilities for design engineering, fabricating, machining and assembling.

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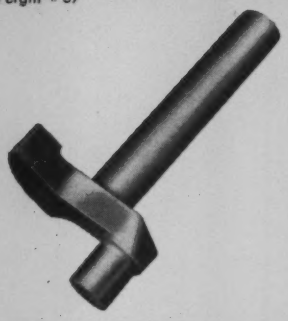
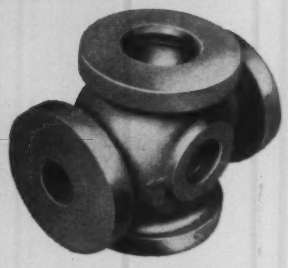
MAHON

URICK'S DUCTILE IRON

Weight #37



Weight #62



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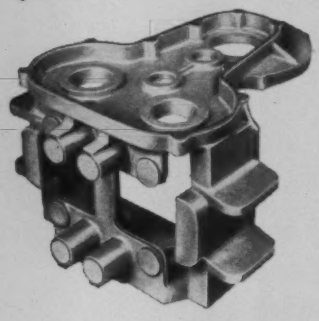

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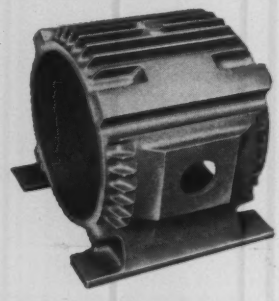

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URICK successfully casts many small parts or components of Ductile iron on a production basis.

Because of URICK'S team "know-how" and modern facilities, these precision castings are no longer considered a custom task involving added expense and time, but are mass produced with effective savings.

Naturally URICK'S knowledge of stress, strain, and impact values helps in recommending Ductile where it will serve best. Possibly you have components that URICK can help you convert to Ductile to your advantage.

Remember, castability, weight reduction and reduced machining time with longer tool life, all add up to real economies. Ask URICK about their Ductile recommendations before you decide on your next casting run.

URICK is the foundry that starts with "U" and stays with YOU. Write for bulletins on URICK'S Ductile and Urite casting facilities.

URITE CASTINGS

URICK FOUNDRY

ERIE, PENNSYLVANIA

LICENSED UNDER PATENTS OF THE INTERNATIONAL NICKEL COMPANY., INC.

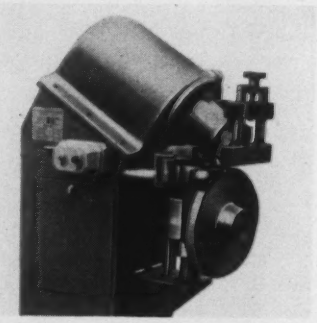
NEW EQUIPMENT

formation with a single strainline compass. This eliminates the need for computation and interpretation of multi-unit installations. (Electronics Instrumentation Div., B-L-H Corp.)

For more data circle No. 63 on postcard, p. 129

Plate Beveller

Compact in every respect, a plate beveller cuts a ½-in. bevel on mild steel plate (or ⅜-in. stainless steel) to prepare the seam for a perfect arc weld fillet. Users report up to 85 pct



savings in bevelling time. The unit is available in three models to cut 30°, 37½° or 45° bevels. Cutting speed with mild steel is about 11 fpm. (American Pullmax Co.)

For more data circle No. 64 on postcard, p. 129

New Floodlights

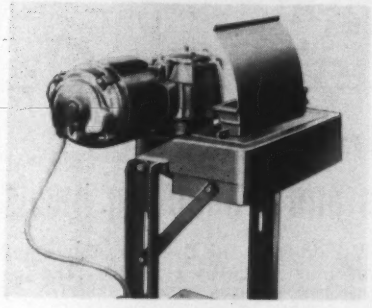
Mercury vapor floodlights feature an ingenious patented full-floating socket construction that adjust automatically to variations in lamp sizes and shapes to insure a perfect weather-seal with all makes of R-60 reflector lamps. This includes mercury vapor in the popular 400-w size, as well as 750-1000 w incandescent lamps. (Stonco Electric Products Co.)

For more data circle No. 65 on postcard, p. 129

Press Scrap Choppers

Improved choppers have been completely re-engineered for efficient cutting at increased operating speeds. These self-contained units chop skeleton scrap as it comes from the press, into a size easily handled and stored for collection. Design and structural improvements have made possible a more positive

cutting action. This eliminates all side motion of the cutting blade. Even thin hardened materials may



now be chopped without blade spread. (Cooper Weymouth, Inc.)

For more data circle No. 66 on postcard, p. 129

Vibrating Feeders

With the addition of 49 new sizes, in two motor capacities, over 60 sizes of motorized counterweight vibrating feeders are available. These machines are compact, low headroom devices for feeding a wide variety of bulk materials — from heavy, sticky ores to light, dry grains — at a uniform rate from bins, hoppers, storage piles or conveyors. (Link-Belt Co.)

For more data circle No. 67 on postcard, p. 129

Roller Burnishing

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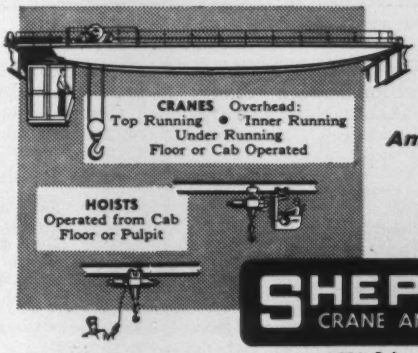

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NAME	COMPOSITION PERCENTAGE Ag	Cu	Zn	Other	MELTING POINT °F	°C	FLOW POINT °F	°C	TROY OUNCES PER CU. IN.
EASY-FLO	50	15½	16½	(18 Cd)	1160	625	1175	635	5.0
EASY-FLO 3	50	15½	15½	(16 Cd-3 Ni)	1170	630	1270	690	5.0
EASY-FLO 45	45	15	16	(24 Cd)	1125	605	1145	620	4.9
EASY-FLO 35	35	26	21	(18 Cd)	1125	605	1295	700	4.9
SIL-FOS	15	80		(5 P)	1185	640	1300	705	4.5
SIL-FOS 5	5	88¾		(6¼ P)	1185	640	1300	705	4.4
TEC*	5			(95 Cd)	640	340	740	395	4.6
TEC-Z*	5		16.6	(78.4 Cd)	480	250	600	315	4.5
BRAZE 071 (SN #7)†	7	85		(8 Sn)	1225	665	1805	985	4.8
" TL	9	53	38		1410	765	1565	850	4.5
" ATT	20	45	30	(5 Cd)	1140	615	1500	815	4.6
" 202 (AT SPEC)†	20	45	35		1315	715	1500	815	4.7
" NE	25	52½	22½		1250	675	1575	855	4.7
" 251 (AE)†	25	57½	17½		1270	690	1625	885	4.7
" NT	30	38	32		1250	675	1410	765	4.7
" DT	40	36	24		1235	670	1415	770	4.8
" SS	40	30	28	(2 Ni)	1220	660	1435	780	4.8
" 404 (SS-5)†	40	30	25	(5 Ni)	1220	660	1580	860	4.7
" DE	45	30	25		1225	665	1370	745	4.8
" ETX	50	34	16		1250	675	1425	775	5.0
" 541 (4772)†	54	40	5	(1 Ni)	1340	725	1575	855	5.1
" 560 (ER)†	56	22	17	(5 Sn)	1145	620	1205	650	5.0
" 580 (EB)†	57½	32½		(7 Sn-3 Mn)	1120	605	1345	730	5.1
" RT	60	25	15		1245	675	1325	720	5.0
" 603 (RT-SN)†	60	30		(10 Sn)	1115	600	1325	720	5.2
" 630 (RSNI)†	63	28½		(6 Sn-2½ Ni)	1275	690	1475	800	5.1
" EASY	65	20	15		1240	670	1325	720	5.1
" 655 (RE-MN)†	65	28		(5 Mn-2 Ni)	1385	750	1560	850	5.2
" MEDIUM	70	20	10		1275	690	1360	740	5.1
" BT	72	28			1435	780	1435	780	5.2
" HARD	75	22	3		1365	740	1450	790	5.3
" 752 (TR #1)†	75		25		1300	705	1330	720	5.1
" IT	80	16	4		1340	725	1490	810	5.3
" 852 (85 Ag-15 Mn)†	85			(15 Mn)	1760	960	1780	970	5.1
PREMABRAZE 610	61	24		(15 In)	1155	625	1305	705	5.0

*A Solder—Not a Brazing Alloy. †Former Names

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The Iron Age Summary

Deferments Cut Steel Bookings

Cancellations and deferments are cutting into second quarter ordering.

Overbooking and duplication of orders show up although rate of consumption stays high.

▪ Steel orders are now running about 10 pct below the level of a month ago.

A flurry of deferments, cancellations, and a general attitude of hesitation contribute to the drop in orders.

Inventories Clipped — In addition, policies of strict inventory control have wiped out a theoretical bulge of from 3 million to 5 million tons of finished steel. Users are determined to keep their steel stocks at the lowest workable level.

But the bottom has not dropped out of the steel market. Nor is it likely to in the foreseeable future. Steel consumption is at the rate of 7 million tons of finished steel a month. This rate, if sustained, assures a good operating rate for the steel industry.

Overbooking Frequent — Deferments and cancellations are largely confined to small users of steel. At the end of the steel strike, many overbooked or duplicated orders for fear of being shut out in the post-strike scramble. But shipments were better than expected. The overbooking and duplication of orders is now showing up.

In a survery of major steel users, these trends are apparent:

Automotive — Production schedules are under constant revision. February production, originally scheduled at over 700,000 cars, will now be closer to 600,000. Although only token cutbacks have been disclosed, more are expected soon.

At the moment, automakers are taking all of the steel they can get. This is expected to continue into April. But by that time, automakers will have their inventories in balance and will approach the desired level—about 20 days.

Farm Equipment and Construction Machinery—Orders are to cut inventory to a minimum. Some plants will order as little as 50 pct in the second quarter of what they booked in the first quarter. This is because of overbooking.

Appliances — Makers of appliances will be up to desired inventory by late March or early April. One product exception is galvanized sheet. Manufacturing operations are good, but here, again, overbooking was general. Second quarter buying may be 30 pct below the first quarter.

Steel Service Centers — Steel warehousemen are revising their first half business downward. Steel price cutting among warehouses has spread, and may continue to do so. One reason warehouse business is below expectation also goes back to the better than expected comeback of steel production. Many users who had prepared to buy large tonnages from the service centers were able to get back on to mill schedules earlier than expected.

Another reflection of the easing market is the fact that foreign steel prices have now returned to competitive levels.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,693	2,693	2,736	2,448
Ingot Index				
(1947-1949=100)	167.5	167.5	170.2	152.4
Operating Rates				
Chicago	97.0	97.5*	95.0	88.0
Pittsburgh	98.0	97.0*	97.0	84.0
Philadelphia	98.5	99.5*	102.0	93.0
Valley	88.0	89.0*	92.0	84.0
West	90.0	90.0*	89.0	85.0
Cleveland	100.0	100.5*	97.0	84.0
Detroit	101.0	96.0*	107.0	97.0
Buffalo	105.0	105.0	105.0	102.0
South Ohio River	100.0	104.0*	97.0	99.0
South	91.5	92.0	93.5	79.0
Upper Ohio River	95.0	93.5*	91.5	87.5
St. Louis	96.0	88.0*	97.0	84.0
Aggregate	94.5	94.5	96.0	86.5

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$39.17	$40.58	$41.83	$43.83
No. 2 bundles	$25.17	$26.50	$28.17	$30.33
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	30.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	101.875	101.00*	100.00	102.75
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

Press Export Market is Booming

Pressmakers report a steady upturn in exports. Growing European industry is the big factor.

On the home front, auto companies and small manufacturers are the best press markets.

■ If there's one bright spot in the U. S. export-import picture, it's in presses.

U. S. press manufacturers report a steady upswing in export orders for both presses and press brakes. The European automotive boom has been a strong factor, but European buyers are also placing heavy orders for presses and press brakes to outfit a number of new, developing industries on the European continent and in South and Central America.

"Almost Gravy" — One U. S. equipment builder comments, "This is the first European order we've had in our company for a couple of years. At least, it's the first one that we've had of this size. We've concentrated on Western hemisphere sales in our export department. This is almost gravy."

Thus far, the pickup in press buying, both in domestic and export markets, hasn't pushed prices upward to any marked degree. The general price picture is firm with a few increases. There is almost none of the cut-pricing that plagued the industry a year ago. Press buyers will be watching carefully, however, as price increases have reached at least the talking stage in a number of equipment building firms which have not yet made any boosts.

At Home—The general outlook for press buildings: The U. S. automotive market is buying well, though not splurging. The real strength in the current increase in sales and inquiries stems from a broad cross section of U. S. industry. One manufacturer points out that small manufacturing plants are now his number one buyer. They outbuy his automotive customers by a fairly strong margin, he says.

Customer inquiries have moved up with sales. This indicates a strong outlook for second quarter. Some press makers are already convinced that they'll do equally well for all of 1960. Backlogs for light equipment, and even some off-the-shelf equipment items, are extended to as much as eight weeks. Immediate delivery for some of this equipment now requires at least some shopping

Better Year Ahead—The entire industry seems to expect a better year, with sales exceeding 1959 levels by even 10 pct. Individual firms, particularly those which have exploited export markets, are talking of sales gains of up to 20 pct. The higher figure is pegged on the fact that a few builders find the upward curve in export sales is actually outstripping their domestic rate of sales gain.

The general outlook suggests a mild increase in press delivery times over the next 90 days. Price increases are likely in the same period. Beyond that, press builders vary widely in the amount of second half business they forecast. But they hint that a second-half steel price increase, plus their own labor cost increases, will tend to peg any current price increases and might call for more price boosts during the second half.

HERE AND ABROAD: Newly pressed fenders are inspected at a Chevrolet plant. Both American and foreign automakers are buying presses at a fast rate and have led pressmakers to expect a good year in 1960.

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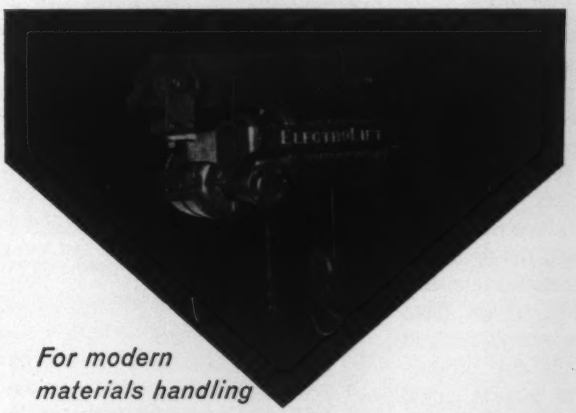

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6 *Warehouses serving the middlewest*

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Warehouses Revise Market Outlook

Steel service centers are taking another look at business prospects for this year.

A major distributor now looks for a 15 pct drop instead of a 10 pct increase in first-half business.

■ Steel service centers are revising estimates for first-half business sharply downward. Some have already cancelled orders for items as hard to get as hot-and-cold-rolled sheets.

A little more than a month ago, the warehouse industry predicted 1960 sales would be 10 pct greater than last year. Now, a major distributor has revised its estimate, predicting a drop of 15 pct for the first half of 1960. Warehouses on the West Coast report sales for the first week of February were off as much as 30 to 50 pct from the year ago week. While the comparison period is small, it has caused some warehouses to tell mills to cancel or hold orders.

Will It Spread? — New price schedules, offering lower prices on small quantity orders, are being met by nearly all distributors in Pittsburgh, St. Paul, Cleveland, Dallas and Houston. Warehouses now expect rescheduling of prices to spread to other cities in the Midwest.

Some customers in unaffected areas are already holding up on purchases. They want to see if warehouses in their area will come through with new schedules.

Sheet and Strip — There's little concern over present orders. Mills are pretty well booked through April. But not all of this tonnage is firm. A **Pittsburgh** mill has had some pushbacks for February and March. However, these have been quickly filled by orders pulled in from the second quarter. In the **Cleveland** area it is getting harder for mills to sell excess hot-rolled sheet and light plate than it was a few weeks ago. Some **Midwest** mills are still behind on deliveries of hot- and cold-rolled sheets; but other mills are moving to offer substantial tonnages of sheet for quick delivery. Flat-rolled products from **East Coast** mills are also being offered to users in the **Midwest.**

Bars — Mills are producing at near capacity rates, but there are signs of a softening in some areas. Forging firms are keeping the market tight in **Cleveland.** As long as they continue to get good orders from the auto industry, they expect to take all of their hot-rolled bar commitments through the first half. Most of their inventories are low and they would like to get them balanced. Currently, this is difficult because of demands for production. However, the market could start easing soon. Some cancellations have occured in the **Midwest.** Hot-rolled bars are being offered for April delivery by some mills. Demand for cold-finished bars remains strong, however. Customer inventories are still low. And mills receive frequent requests for rush deliveries. Orders are good through April. But mills are reluctant to make estimates beyond then. And they admit they're in the process of revising estimates for the first half —downward.

Wire—Furniture and auto producers continue to offer a good market for manufacturers wire. And fastener makers are taking all of the cold-heading wire they can get. Demand for other products, however, is off seasonally. Merchant wire buildup for spring hasn't been started by distributors. One reason for the delay is the fact they placed heavy orders late last year when it looked as though the steel strike would resume.

Plate and Shapes — The plate market is showing some signs of sagging. Deferments and cancellations are showing up for March and beyond on the **East Coast** and at **Pittsburgh.** So far, the tonnages involved aren't too large. And plate mills still expect to operate at a pretty good level through April. But inventory rebuilding is just about complete and mills look for some easing in the second quarter. Foreign wide plates were still being offered in the **Midwest** last week at prices up to $25 over U. S. mill prices, but buyers were hard to find. There have been no cancellations or hold orders from the area, but buyers are becoming more cautious. They expect prices for foreign plate to drop in the next two weeks. Also, they expect the domestic supply to ease after April.

Pipe and Tubing—Based on a limited line of products and rebuilding of downriver stocks, a **Pittsburgh** mill reports a three-month backlog of oil country seamless. The mill says there is no steam in demand, but points out that reports from the **Southwest** show a revival in drilling can be expected in the next two months.

PURCHASING AGENT'S CHECKLIST

Changing technology booms markets for minor metals. P. 67

Fast comeback by mills and tight inventory policies by users have eased steel market. P. 72

Management plays big role in furthering use of numerically-controlled machine tools. P. 107

COMPARISON OF PRICES

(Effective Feb. 16, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Feb. 16 1960	Feb. 9 1960	Jan. 19 1960	Feb. 17 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.00	14.00**	14.00**	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Feb. 16 1960	Feb. 9 1960	Jan. 19 1960	Feb. 17 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$40.50*	$42.50	$43.50	$47.50
No. 1 steel, Phila. area	39.50*	40.50	41.50	39.50
No. 1 steel, Chicago	37.50*	38.75	40.50	44.50
No. 1 bundles, Detroit	37.50*	39.50	39.50	39.50
Low phos., Youngstown	45.50*	46.50	48.50	49.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	51.50
No. 1 mach'y cast, Phila.	52.50*	54.50	54.50	56.50
No. 1 mach'y cast, Chicago	57.50*	59.50	60.50	57.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$39.17*	$40.58	$41.83	$43.83
No. 2 bundles	25.17*	26.50	28.17	30.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	30.00
Copper, Lake, Conn.	33.00	33.00	33.00	30.00
Tin, Straits, N. Y.	101.875†	101.00	100.00	102.75
Zinc, East St. Louis	13.00	13.00	13.00	11.50
Lead, St. Louis	11.80	11.80	11.80	11.30
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites
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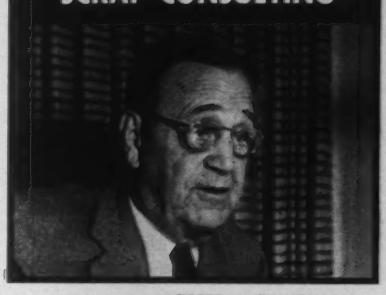

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Prices Continue Down As Buyers Rule

The market lost ground again this week as lack of buyer interest dropped prices.

Dealers are gloomy about prospect of any improvement for many weeks.

▪ Prices kept heading downward this week as dealers searched for buyers.

Dealer pessimism spread as both brokers and mills limited their buying. In some cases, the lower prices brought out tonnage. In others, activity was limited. The mills continue taking in only small tonnages. Forward buying is generally absent. Some buyers are working down industrial scrap tonnages bought earlier. With a few exceptions, there's little real buying strength in the market.

Dealers Gloomy — Dealers are not encouraged about market prospects. Some expect a gradual downward movement for weeks or even months. And the chance of a sharp break, taking prices down another $2 to $3 a ton, is not ruled out.

Factors of strength are lacking in the market. Export sales are not as brisk. Mill buyers are expected to set prices for the March industrial lists.

With prices declining at Chicago, Pittsburgh, and Philadelphia, The IRON AGE No. 1 heavy melting Composite fell for the third week in a row.

Pittsburgh—Prices dropped again this week as the market looked for a level that would produce buyers. Dealers are not in the mood to resist lower prices. But the sellers feel the situation has not yet reached the desperate stage. Mill buyers, however, still show few signs of interest. Lack of activity makes it difficult to estimate the extent of the weakness. But all signs point to a rapid downward slide. A broker's buying price for No. 1 railroad heavy melting was $6 under last month's high.

Chicago — The market broke sharply for the second week in a row. Reduced mill prices brought out substantial tonnages of railroad and dealer steelmaking grades. Electric furnaces grades shared in the general break despite a strong level of foundry activity. Blast furnace grades sold at lower prices. But the tonnages involved were not large.

Philadelphia—Prices kept heading downward in a dull market. Steelmaking grades declined $1 below last week's level. Mills are taking only small tonnages and show no signs of forward buying. Export is also less active. Dealers are hopeful stronger demand will prop up the market.

New York—The market is quiet. Brokers took about what they wanted at the end of January. Since then, they haven't been doing much buying. Steelmaking grades are off $1 to $2 a ton.

Detroit — The dealer market is gloomy. Prices are falling, with trading only scattered. Local mills continue to shun dealer scrap. Both dealers and brokers expect it will be at least three months before a break comes. Mill buyers are expected to call the shots on prices of March industrial lists.

Cleveland — Mills are coasting along on industrial scrap purchased earlier. As a result, prices locally and in the Valley dropped off another $1. Dealers are caught in middle. Most are only able to sell secondary grades and turnings. Some industrial scrap is being offered as low as $45 a ton at Valley points. Cast grades, which have been firm until recently, are starting to slip.

St. Louis—Mills are not interested in large-scale buying. Many are loaded with scrap. Some are even holding up shipments on scrap bought earlier. Buyers will listen to offers on new offerings. But they have withdrawn previous prices and are revising their lists downward.

Cincinnati—Lower broker buying pushed the market down $1 a ton. The outlook is for an additional drop soon. Dealers believe prices $2 to $3 a ton lower are possible. Activity is at fair levels.

Birmingham — The market is weakening. Dealers were disappointed in earlier hopes prices would hold. Electric furnace bundles dropped $1 a ton.

Buffalo—Weakness is spreading through the market with supplies exceeding demand. But activity has been lacking. Prices dropped in all except cast grades. Sales of cupola cast were at quoted prices.

Boston — Price drops for most grades reflect the downward trend around the country. Actually the market here is very quiet. There is little doing in either the domestic or export area.

West Coast—Despite last week's drop, scrap prices are still soft and there's a feeling that another price drop is in the making. The market is dull. Some dealers are now in Japan negotiating business for next quarter.

Houston — Both dealers and brokers are depressed about the market. Trading is very limited. Good markets for scrap are very hard to find.

Tangled turnings, 30 cubic yards of them, slide smoothly out of Huge-Haul container, in one swoop! No obstructions at rear corners of the container to "hang up" the load. And doors open to *full width*.

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SCRAP PRICES *(Effective Feb. 16, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	42.00 to 43.00
No. 1 factory bundles	48.00 to 49.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	23.00 to 24.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	27.00 to 28.00
Low phos. punch'gs plate.	49.00 to 50.00
Heavy turnings	35.00 to 36.00
No. 1 RR hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	63.00 to 64.00
RR specialties	55.00 to 56.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	48.00 to 49.00
Stainless	
18-8 bundles and solids.	230.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles and solids.	125.00 to 130.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	37.00 to 38.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Low phos. forge crops	52.00 to 53.00
Low phos. punch'gs plate, ¼ in. and heavier	48.00 to 49.00
Low phos. 2 ft and under	45.00 to 46.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	51.00 to 52.00
Rerolling rails	60.00 to 61.00
Rails 2 ft and under	58.00 to 59.00
Angles and splice bars	50.00 to 51.00
RR steel car axles	56.00 to 57.00
RR couplers and knuckles	47.00 to 48.00
No. 1 machinery cast.	57.00 to 58.00
Cupola cast.	49.00 to 50.00
Cast iron wheels	45.00 to 46.00
Malleable	59.00 to 60.00
Stove plate	46.00 to 47.00
Steel car wheels	47.00 to 48.00
Stainless	
18-8 bundles and solids.	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids.	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	22.00 to 23.00
Mixed bor. short turn.	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	26.00 to 27.00
Clean cast. chem. borings.	27.00 to 28.00
Low phos. 5 ft and under.	45.00 to 46.00
Low phos. 2 ft punch'gs.	47.00 to 48.00
Elec. furnace bundles	45.00 to 46.00
Heavy turnings	33.00 to 34.00
RR specialties	48.00 to 49.00
Rails, 18 in. and under	66.00 to 67.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	46.00 to 47.00
Cast iron car wheels	49.00 to 50.00
Malleable	65.00 to 66.00
No. 1 machinery cast.	52.00 to 53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	21.00 to 22.00
Low phos. 18 in. and under	48.00 to 49.00
Rails, random length	51.00 to 52.00
Rails, 18 in. and under	60.00 to 61.00
No. 1 cupola cast.	47.00 to 48.00
Hvy. breakable cast.	39.00 to 40.00
Drop broken cast.	56.00 to 57.00

Youngstown

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	34.50 to 35.50
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	20.50 to 21.50
Shoveling turnings	25.50 to 26.50
Low phos. plate	45.00 to 46.00

Cleveland

No. 1 hvy. melting	$39.50 to $40.50
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	39.50 to 40.50
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	21.50 to 22.50
No. 1 busheling	39.50 to 40.50
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Cut structural & plates, 2 ft & under	46.00 to 47.00
Drop forge flashings	39.50 to 40.50
Low phos. punch'gs plate.	40.50 to 41.50
Foundry steel, 2 ft & under	40.00 to 41.00
No. 1 RR hvy. melting	45.00 to 46.00
Rails 2 ft and under	60.00 to 61.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	57.00 to 58.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	48.00 to 49.00
Malleable	62.00 to 63.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	100.00 to 110.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 busheling	35.00 to 36.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	19.00 to 20.00
Low phos. plate	43.00 to 44.00
Structurals and plate, 2 ft and under	43.00 to 44.00
Scrap rails, random lgth.	41.00 to 42.00
Rails 2 ft and under	51.00 to 52.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	25.00 to 26.00
No. 1 RR hvy. melting	43.00 to 44.00
Rails, random lengths	51.00 to 52.00
Rails, 18 in. and under	55.00 to 56.00
Angles and splice bars	49.00 to 50.00
RR specialties	46.00 to 48.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	44.00 to 45.00
Cast iron car wheels	45.00 to 46.50
Rerolling rails	60.00 to 61.00
Unstripped motor blocks.	45.00 to 46.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles.	41.00 to 42.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft.	44.00 to 45.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	52.00 to 53.00
Rails, 18 in. and under	56.00 to 57.00
Angles and splice bars	49.00 to 50.00
Rerolling rails	61.00 to 62.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks.	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	26.00 to 27.00
No. 2 dealer bundles	17.00 to 18.00
Machine shop turnings	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings.	22.00 to 23.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	36.00 to 37.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	36.00 to 37.00
Drop forge flashings	36.00 to 37.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Heavy breakable cast.	39.00 to 40.00
Mixed cupola cast.	46.00 to 47.00
Automotive cast.	51.00 to 52.00
Stainless	
18-8 bundles and solids.	210.00 to 215.00
18-8 turnings	80.00 to 85.00
430 bundles and solids.	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	15.50 to 16.50
Clean cast. chem. borings.	14.50 to 15.50
No. 1 machinery cast.	41.00 to 42.00
Mixed cupola cast.	36.00 to 37.00
Heavy breakable cast.	34.50 to 35.50

San Francisco

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	34.00
No. 2 bundles	22.00
Machine shop turn.	$19.00 to 20.00
Cast iron borings	19.00 to 20.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	35.00
No. 1 dealer bundles	34.00
No. 2 bundles	20.00
Machine shop turn.	$17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Elec. furn. 1 ft and under (foundry)	49.00
No. 1 cupola cast.	46.00 to 47.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

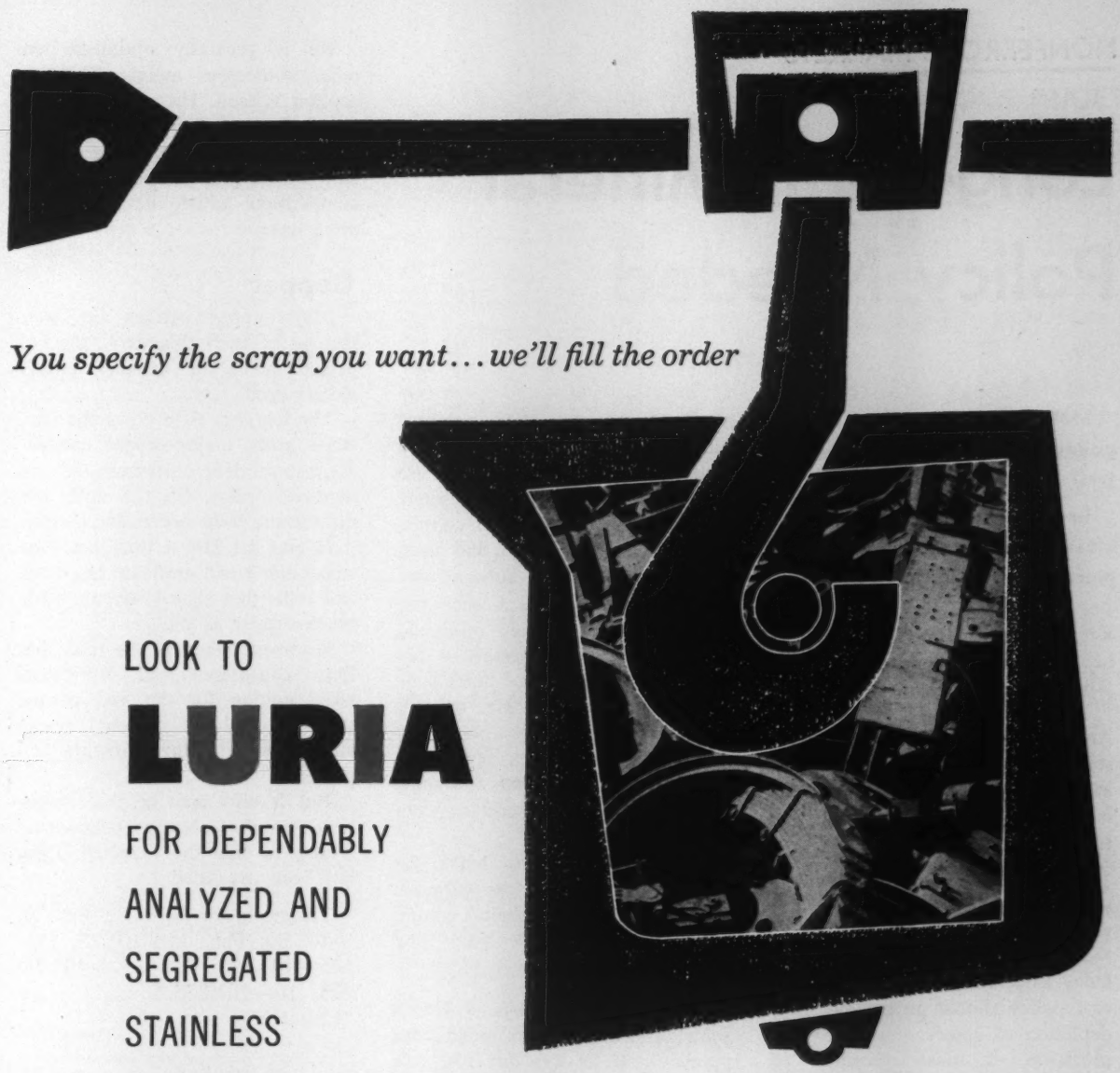
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	36.00
No. 2 bundles	26.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$47.00 to 48.00
Unstripped motor blocks.	34.00 to 35.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	31.00 to 32.00



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Long-Term Mineral Policy Needed

SME president urges total policy on minerals, long-term as well as short-term.

In market analysis, he advises close attention on the "glamor" metals.

▪ "It's highly important that there be established a national mineral policy—long-term and short-term."

This is the conviction of Dr. Arthur B. Cummins, newly installed president of the Society of Mining Engineers. And he says this is a major problem that must be solved in the 1960's.

Over-all-View — Dr. Cummins, speaking at the annual meeting last week of the American Institute of Mining, Metallurgical and Petroleum Engineers, believes the Federal policy should go beyond mere depletion of reserves and new exploration. It must consider "all national and international problems in the procurement, distribution and stockpiling of mineral materials."

The SME president, who is manager, mineral and basic research, Johns-Manville Corp., commented that Russia is "a significant competitor in some international markets." He believes that while the Reds are still trailing in output and export of most minerals, they definitely are catching up.

What's the answer? Dr. Cummins says only American aggressiveness and progress can take the edge from the Russian threat.

Supply Strategy—Also on international questions, Dr. Cummins reports that in the 1960's the U.S. will continue to be dependent in a large part on foreign sources for nickel, tin, antimony and tungsten, and, to a lesser degree, for copper, lead, zinc, thorium, beryl, and many nonferrous ores and concentrates.

Why? It will remain economic to import some of these minerals.

Generally, Dr. Cummins is optimistic for nonferrous metals in the coming decade. He believes aluminum capacity will be in excess of demand for a few years. But, he says, aluminum and magnesium will gain ground as construction materials.

And Dr. Cummins looks for greater demand for less common metals; tungsten, cobalt, columbium, tantalum, zirconium and others.

Watch Glamor Metals — Here's something he suggests nonferrous people keep an eye on: The role of the "glamor" metals such as beyllium, tungsten, and columbium will be greatly emphasized in the growth of space age technology.

On the other hand, he suggests, "If the means of conventional defense of warfare becomes obsolete, then requirements, on a large scale, for lead, aluminum, copper, etc., may be expected to diminish to a significant extent."

Copper Price Drop? — Joseph L. Gillson, new president of AIME and chief du Pont geologist, has some encouraging views for copper users. He says, it is almost certain that when production gets rolling again after the long series of strikes, the price will drop.

He is generally optimistic on other nonferrous metals. The exception is lead. He points out the lead industry has not been able to enter many new markets, and is still suffering from heavy foreign competition which has kept the price low.

Copper

Major copper strikes are over. But, as of early this week, the expected boost in demand hadn't materialized.

The lag goes right down the line. Brass mills, major copper customers, report their customers did not increase orders. So the mills did not incease their orders for copper.

It may be just a time lag. The strike didn't end until late last week and mills that signed haven't made much copper as yet.

However, many in the trade believe consumers and fabricators were waiting for the end of the strikes to rebuild depleted stocks and avoid putting pressure on prices.

But it also may be that inventories aren't as low as believed or it may be that the expected boom has been overrated.

Tin prices for the week: Feb. 10—101.00; Feb. 11—101.25; Feb. 12 — 101.375; Feb. 15 — 101.75; Feb. 16—101.875.*

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum Ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	35.00	33.00	12/23/59
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 167.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048–.061	.077–.096	.136–.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.83	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bs.	56.17	56.46	55.86	59.43
Mang. Bs.	58.86	.....	52.21	.....
Phos. Bs. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base ... $ 1.31
Cobalt, 97-99% (per lb) ... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $211 to $214
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 30.75
No. 120 ..... 29.75
No. 123 ..... 28.75
80-10-10 ingot
No. 305 ..... 35.25
No. 315 ..... 33.00
88-10-2 ingot
No. 210 ..... 44.00
No. 215 ..... 40.75
No. 245 ..... 36.00
Yellow ingot
No. 405 ..... 24.75
Manganese bronze
No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 26.25-26.50
0.60 copper max. 26.00-26.25
Piston alloys (No. 132 type)..28.00-29.00
No. 12 alum. (No. 2 grade)...24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)...25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective Feb. 16, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22½	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29¼
No. 2 copper wire 26
Light copper 23¾
*Refinery brass 24¼
Copper bearing material 23½
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 27½
No. 2 copper wire 25¾
Light copper 23½
No. 1 composition 22½
No. 1 comp. turnings 22
Hvy. yellow brass solids 16½
Brass pipe 16½
Radiators 17½

Aluminum

Mixed old cast. ..... 14½—15½
Mixed new clips ..... 17 —17½
Mixed turnings, dry ..... 15 —16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 26¼—26¾
No. 2 copper wire ..... 22¾—23¼
Light copper ..... 21¼—21⅝
Auto radiators (unsweated). 14½—14¾
No. 1 composition ..... 18½—19
No. 1 composition turnings.. 17 —17½
Cocks and faucets ..... 14¾—15
Clean heavy yellow brass ... 12¾—13¼
Brass pipe ..... 14¾—15
New soft brass clippings .... 15 —15¼
No. 1 brass rod turnings .... 12¼—12½

Aluminum

Alum. pistons and struts .... 7½— 8
Aluminum crankcase ..... 11¼—11¾
1100 (2s) aluminum clippings 15 —15½
Old sheet and utensils ..... 11¼—11¾
Borings and turnings ..... 7 — 7½
Industrial castings ..... 11¼—11¾
2020 (24S) clippings ..... 12½—13

Zinc

New zinc clippings ..... 7 — 7¼
Old zinc ..... 4½— 5
Zinc routings ..... 3½— 3½
Old die cast scrap ..... 2¾— 3

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 28-29
Clean Monel turnings 20-23
Old sheet Monel 24-26
Nickel silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 8 — 8¼
Battery plates (dry) ..... 3 — 3¼
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 55 —56
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 9¾—10¼
Solder joints ..... 13¼—13¾
Siphon tops 41
Small foundry type ..... 9¾—10¼
Monotype ..... 9¾—10¼
Lino. and stereotype ..... 8¾— 9
Electrotype ..... 7½— 7¾
Hand picked type shells .... 5¼— 5¾
Lino. and stereo. dross ..... 2¼— 2¾
Electro dross ..... 2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *Sl2 C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.00 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Feb. 16, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.			Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Helloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*			6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*				$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*		6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.										6.70 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*							
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*										
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*				6.40 *A5, R3, W8*			
	Sterling, Ill.										6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*			6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*						
	Newport, Ky.	5.10 *A9*	6.275 *A9*											
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*			6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*									$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*							6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*								
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*					$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*		6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*								6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*				$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*			6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*				$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*												
	Kansas City, Mo.										6.65 *S2*			
	Los Angeles, Torrance, Cal.										7.20 *B2*			
	Minnequa, Colo.										6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*							7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*						6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas										6.65 *S2*			

* Electrogalvanized sheets.

(Effective Feb. 16, 1960)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. **Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.**

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Roadville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.075 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,13, Y1*	5.675 *U1,13, Y1*	7.65 *R3,J3*	6.725 *U1,13, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,13, Y1*	6.375 *J3, 11*	7.50 *U1, Y1*	7.95 *U1, Y1,13*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Feb. 16, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (net) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective Feb. 16, 1960)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2

High-carbon chromium.. .955 D-3, D-5
Oil hardened manganese .505 O-2
Special carbon ..... .38 W-1
Extra carbon ..... .38 W-1
Regular carbon ..... .325 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

Furnace, beehive (f.o.b.) Net-Ton
Connellsville, Pa. .....$14.75 to $15.50
Foundry, beehive (f.o.b.) $18.50
Foundry oven coke
Buffalo, del'd $33.25
Ironton, O., f.o.b. 30.50
Detroit f.o.b. 32.00
New England, del'd 33.55
New Haven, f.o.b. 31.00
Kearney, N. J., f.o.b. 31.25
Philadelphia, f.o.b. 31.00
Swedeland, Pa., f.o.b. 31.00
Painesville, Ohio, f.o.b. 32.00
Erie, Pa., f.o.b. 32.00
St. Paul, f.o.b. 31.25
St. Louis, f.o.b. 33.00
Birmingham, f.o.b. 30.35
Milwaukee, f.o.b. 32.00
Neville Is., Pa. 30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

Gross Ton
Openhearth lump $12.70
Old range, bessemer 11.85
Old range, nonbessemer 11.70
Mesabi, bessemer 11.60
Mesabi, nonbessemer 11.45
High phosphorus 11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00
High duty (except Salina, Pa., add $5.00) 140.00
Medium duty 125.00
Low duty (except Salina, Pa., add $2.00) 103.00
Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00
Childs, Hays, Latrobe, Pa. 163.00
Chicago District 168.00
Western Utah 183.00
California 165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 163.00-168.00
Silica cement, net ton, bulk, Latrobe 29.75
Silica cement, net ton, bulk, Chicago 26.75
Silica cement, net ton, bulk, Ensley, Ala. 27.75
Silica cement, net ton, bulk, Mt. Union 25.75
Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.$109.00
Standard chemically bonded, Curtiner, Calif. 119.00
Burned, Balt. 103.00

Magnesite Brick

Standard, Baltimore $140.00
Chemically bonded, Baltimore 119.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
In bulk 46.00
In sacks 52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.75
Missouri Valley 15.60
Midwest 17.00

(Effective Feb. 16, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	.....	.....	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	173	190	177	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer,Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.60	10.15
Rankin, Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12,90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12,90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.50
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Molding Grades	
Electrolytic, domestic f.o.b. shipping point	49.25
Precipitated	48.50
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	49.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws	*Discount (Packages)*
	Full Finished H. C. Heat Treat
New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54 — 42
¾", ⅞", and 1" diam. x 6" and shorter	38 — 23
⅝" diam. and smaller x longer than 6"	.. — ..
¾", ⅞", and 1" diam. x longer than 6"	.. — ..
	C-1018 Steel Full-Finished Cartons Bulk
¼" through ⅝" dia. x 6" and shorter	59 — 48
¾" through 1" dia. x 6" and shorter	45 — 32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Plain Finish Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller — 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 1¢ per lb)	19.75
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums (Philadelphia price 25.00)	23.70
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	$.10	9.90	10.10	10.16	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.91	9.79	10.00	9.59	13.14	16.76	.....	.....	.....
Boston**	.10	10.52	11.27	11.87	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	10.25	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.28	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		10.13	10.60	12.19	11.28	9.47	9.34	9.42	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.50	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.59	11.45	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.99	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.79	10.73	11.48	10.45	8.73	9.40	8.90	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅜-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Feb. 16, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31–0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01–15.50), $101.00; Keokuk (14.01–14.50), $89.00; (15.51–16.00), $92.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS.

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective Feb. 16, 1960)

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Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19% ..	$98.00	$96.00	$100.50
19-21% ..	100.00	98.00	102.50
21-23% ..	102.50	100.50	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective Feb. 16, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, fo.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

STEEL MILL SPECIALS

TYPICAL PACKAGE DRIVES

(1) 3000-HP. Gen. Elec. Motor, 600-B.D.C. 90/180 R.P.M. with
(1) 3000-K.W. 3-unit Allis-Chalmers M.G. set, 600-V.D.C. with 5000-HP. Syn. Motor 13800/-6900/4160-V., 3 ph., 60 cy. & Mag. F.V. starting equipment.
(2) 600-H.P. Al.Chal. Motor, 600-V.D.C. 300/600 R.P.M. with
(1) 1000-KW. 3-unit M.G. set (2) 500-K.W. 600-V.D.C. Generators, & 1500-H.P. Syn. Motor, 2300-V., 3 ph., 60 cy. & starting equip's.
(2) 300-H.P. Whse. Motors, 230-V.D.C. 300/600 R.P.M. with
(1) 600-KW., Gen. Elec. 3-unit M.G. Set (2) 300-KW. Generators & 750-H.P. Syn. Motor, 4160/2300-V., 3 ph., 60 cy. & Mag. F.V. starting equipment.

(Any above items can be purchased separately)

ADJUSTABLE SPEED MOTORS

QU.	H.P.	MAKE	VOLTS	R.P.M.
1*	2550	Whse.	700	108/162
1*	2200	Whse.	600	92/132
1*	2000	G.E.	600	200/400
1*	2000	G.E.	350	230/350
1*	1750	G.E.	600	200/300
1*	750	Whse.	250	200/400
4*	700	Whse.	250	300/700
2*	645	S & S	300	1000
1	600	Whse.	250	110/220
2	235	Whse.	230	325/975
1	150	Whse.	230	400/1200
1	125	Whse.	230	450/900
1	35/110	G.E.	250	255/1650
1	75	Whse.	230	250/1000

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GUARANTEED—RE-NU-BILT

Electric Power Equipment — A. C. Motors

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-579BS	4800	1800
1	1500	G.E.	MT	6600	1187
1	800	Whse.	CW	550	1776
1	600	Whse.	CW	220/440	900
1	600	Whse.	CW-4-32D-15	440	1778
1	550	Whse.	CW	440	252
1	500	Whse.	CW	550	350
1	300	A.C.	ANY	440/2300	720
1	300	G.E.	MTP561	2200	1800
1	200	G.E.	IM	440/2200	589
1	125	G.E. unused	MT-557	220/440	1200
1	100	G.E.	MT-564	440/220	450
1	250	G.E.	IM-16	220/440	875
1	250	A.C.	ANY	550	600
1	250	Cr. Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	IE-13B	220	1800
2	200	Whse.	CW-890	2300	1775
2	200	G.E.	IM-17A	2200	435
3	100	A.C.		440	695

SQUIRREL CAGE

1	500	G.E.	FT-559AY	2200	3600
1	500	Whse.	CS-1115	2200	863/445
4	500	Whse.	CS-1216	2200	500
2	450	Ell.	F-3910	2200	1200
1	400	Whse.	CS-7151-610H	6600/4000	3585
1	300	Whse.	CS-1002	2300/440	600
1	250	Whse.	CS-8758	2200	1775
1	200	Whse.	CSP-581S	440	3450
2	200	Whse.	CS-8558 D.P.	220/440	1750
1	150	G.E.	FT-558	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
3	100	Whse.	CS-760C	2200/440	1100
1	100	Whse.	B.B.CS-607	220/440	1780

SYNCHRONOUS

1	6000	G.E.	ATI .8 P.F.	2200/6600	600
1	3500	G.E.	TS 1.0 P.F.	4600/2300/4000	360
1	2000	G.E.	ATI	2300	900
2	1750	G.E.	ATI	2300	3600
1	1750	G.E.	TS	2300/4600	900
1	700	G.E.	TS .8P.F.	2300	1200
1	350	Whse.	1.0P.F.	440	900
2	350	G.E.	ATI 1.0P.F.	2300	150
1	325	G.E.	ATI 1.0P.F.	140	1800
2	300	El Mach.	BRKT	2200	1200

BELYEA COMPANY, Inc.

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Detroit Dealers See Good First Quarter

Most used machine dealers in the Detroit area are optimistic about early 1960 sales.

But, there are others who complain business is up while profits are down.

■ Used machine business in Detroit, from a dealer standpoint, will be better in the first quarter of 1960 than in 1959, based on January reports.

Customer interest is up. Dealers and brokers are expressing more optimism than in the blackest days of the steel strike four months ago.

A Better Year — A 32-year-veteran broker, appraiser and auctioneer predicts used machine sales will be "a bit better than 1959." Last year was better than 1958, which has been rated the worst year in history by many.

Most dealers agree prices are stable. Some say they are a little lower than last year. But they haven't changed much and no steep ups or downs are expected this year. There is plenty of haggling, though. Shoppers are choosey and willing to search for the best.

A large firm specializing in presses and metal processing tools reports interest in presses and brakes is gaining.

Large Firms Buying — The general sales manager says big, multiple spindle hydraulic drilling equipment is a hot item. Purchasers are basically large firms which make jigs and fixtures for the auto trade. The manager believes record car production in January stirred used machine sales.

Opposed to this view is another Detroit dealer. He claims auto-making has no effect on today's market. "It's helping manufacturers of special automation machines, but that's all," he says. "I won't say we aren't making more money than last year. But we're putting in longer hours and reaping smaller profits per sale."

He cites an example of the profit margin he and his fellow dealers are contending with today. He bought a radial drilling machine for $6500, he says, and sold it for $6900. He wasn't happy with the 6 pct profit. "The minimum profit we expected in the past was 10 pct," he says.

Government Auctions Hurt — He says machines sold at government auctions are being taken for one fifth of their original price tag. A machine bought a few years ago by the government for $20,000, for example, can be bought for $4000 today. He says dealers are finding such prices hard to compete against.

The same dealer says his best selling items are sheet metal machines, cold heading equipment, thread rolling equipment and structural steel machinery such as presses and brakes.

In good supply are special purpose machine tools built since 1950, especially thread grinders and internal grinders. Machine tools for the slowed-down aircraft industry are low-interest items. These include big lathes for turning out jet aircraft cowls.

ROLLING MILLS—STEEL WORKS EQUIPMENT

1—32" & 20" x 110" PLATE MILL, 3-high.

1—28" x 40" HOT STRIP MILL, 2-high reversing, with 2500 HP D.C., motor generator, etc.

1—25" & 42" x 60" HOT STRIP MILL, 4-high.

1—24" x 36" 2-HIGH MILL driven by 400 HP motor, 4600/3/60.

1—22" x 36" 2-HIGH MILL driven by 600 HP motor, 4660/3/60.

1—2½" & 8" x 8" COLD STRIP MILL, 4-high.

1—8" x 10" COLD MILL including uncoiler.

2—28" 3-HIGH ROLL STANDS.

1—18" 3-HIGH BAR MILL, single stand.

1—New 16" BAR MILL, one 3-high roll stand, pinion stand.

1—10" BAR MILL with motor and gear drive.

1—9" BAR MILL, 3-high, five stands.

1—34" x 192" ROLL GRINDER.

2—65-Ton ELECTRIC MELTING FURNACES, TOP CHARGE, with all electrical and mechanical equipment, including 15,000 KVA and 13,333 KVA transformers.

1—OPEN SIDE BAR SHEAR, Williams & White No. 14½, or 1¾" round.

1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 36" dia. rolls.

1—OPEN HEARTH CHARGING MACHINE, 5 ton capacity 11' track gauge.

1—STRUCTRAL STEEL BUILDING 50' x 396', crane runway.

1—MAGNETIC SEPARATOR double pulley, Stearns.

1—SIDE TRIMMER. Streine, maximum width 48" makes 2 cuts 316" mild steel.

1—SCRAP BALLER, max. size scrap roll 24" O.D. x 24" long.

1—HALLDEN STRAIGHTENING and cutting-off machine, capacity .562" brass rod.

1—POINTER for tube 2" O.D. x ¼" wall maximum.

1—1200 HP GEAR DRIVE, 295 to 30 RPM

1—1200 HP GEAR DRIVE 353 to 94.5 RPM 3.73 to 1 ratio.

1—600 HP GEAR DRIVE, 1.868 to 1.

1—3500 HP MOTOR, 11000/6600 volts, 3 phase, 60 cycle, 514 RPM, synchronous, never used.

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RAILWAY CARS and REPAIR PARTS
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3, G. E. 44-Ton, 400 H. P. Std. Ga.
1, G. E. 80-Ton, 500 H. P., Std. Ga.
10, 70-Ton COVERED HOPPER CARS
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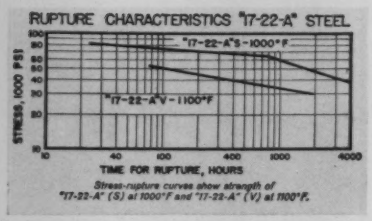
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